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POTOSÍ

BY

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In November and December, 1908, I was engaged in following on mule-back that part of the old Spanish trade route from Lima to Buenos Aires which lies in Southern Bolivia. The chief objective point of all traders in colonial days was Potosí, which was, for over a century, the largest city in the Western Hemisphere. With the comparative exhaustion of its silver mines, decay set in and it became little more than a memory until the increasing demand for tin caused a renewal of local activity.

I had long had a desire to see this spot towards which the covetous eyes of the world were turned for so many years. And I had not been here many hours before I realized that it was still a most fascinating place, with an atmosphere of departed greatness quite unique in America. By the time I had been in Potosí a week I was ready to agree with those who call it the most interesting city in South America.

The prestige of its untold wealth, the evidence on every side of former Spanish magnificence, the picturesquely clad Indians and the troops of graceful, inquisitive llamas in the streets, could not help but arouse both curiosity and interest.

My first duty was to call on the Prefect, who had been expecting our arrival and was most kind during our entire stay. A Bolivian Prefect has almost unlimited power in his Department and is directly responsible to the President. His orders are carried out by the Sub-

Prefect, who is also Chief of Police and has a small body of soldiers under his immediate control.

We found the Government House, or *Prefectura,* to be a fine old building dating back to colonial days. Probably the most interesting person that has ever occupied it was Gen. William Miller, that picturesque British veteran who fought valiantly through all the Peruvian wars of independence, receiving so many wounds that he was said to have been "honeycombed with bullets." At the end of the wars he was appointed Prefect of Potosí and it was during his incumbency that the great Liberator Simon Bolivar made his visit. There is a vivid description of it in Miller's "Memoirs." When Bolivar arrived in sight of the far-famed mountain, the flags of Peru, Buenos Aires, Chile and Colombia were unfurled on its summit. As he entered the town, twenty-one petards were exploded on the peak, an aerial salute "that had a very singular and imposing effect." "Upon alighting at the Government-house, under a grand triumphal arch, decorated with flags, the reception of his Excellency was according to the Hispanic-American taste. Two children, dressed as angels, were let down from the arch as he approached, and each pronounced a short oration! Upon entering the grand saloon, six handsome women, representing the fair sex of Potosí, hailed the arrival of his Excellency, crowned him with a wreath of laurel, and strewed flowers, which had been brought from a great distance for the occasion." This was followed by seven weeks of bull fights, dinners, balls, fireworks, illuminations and other signs of public rejoicing, which would seem to have surfeited even a person so fond of pomp and adulation as the great Liberator.

Opposite the Government House, on the east side of the main plaza, is a curious many-arched rococo wall which encloses a new and smaller plaza, the work of an ambitious Prefect. The tall column surmounted by a statue that stands as its only ornament, once stood in the center of the larger square, but was moved to its new position by the Prefect who decided his work would be incomplete unless properly graced by a monument!

On a corner of the new plaza is Potosí's only book shop. Judging by the stock in trade, the principal customers are school children and lawyers. Trade was dull when we were there, although considerable interest was shown in those departments of the store where toys and picture post cards were on sale.

Nearby is the "University," where inferior secondary instruction is given to poor little boys, who sit on damp adobe seats in badly lighted, foul-smelling rooms. It was once a convent, but the church

connected with it has long since been transformed into a theatre. The only attractive thing about the "University" is the charming old convent garden, where a few rare flowers still try to bloom.

Opposite the "University" is the club. Here there are billiard tables (it is really remarkable how many billiard tables one finds scattered all over South America, even in the most inaccessible places) and a bar. The custom of serving a felt mat with each drink is resorted to, and when a member chooses to stand treat, he goes about and gathers up all the mats in sight and pays for them with his own money, or some that he has recently won. The bar was well

FIG. 1—The Slopes of the Cerro, Potosí in the distance.

patronized. And no one is to blame but the climate, which is the worst in South America.

Although Potosí is in the tropics, the highest recorded temperature here in the shade on the hottest day ever known, was 59° F. The city is nearly 13,500 feet above the sea, almost as high as Pike's Peak. Every afternoon cold winds sweep down through the streets, striking a chill into one's very marrow. A temperature of 22° F. is not unknown, yet none of the houses have stoves or any appliances (except soup) for warming their shivering inhabitants. As the prevailing temperature indoors is below 50° F., nearly every one wears coats and hats in the house as well as outdoors, or even more so, for a brisk walk of a block or two at this altitude makes one quite warm, and in the middle of the day the sun is hot.

Wherever we wandered in this fascinating city, our eyes con-

tinually turned southward to the Cerro, the beautifully colored cone that raises itself 1,500 feet above the city. It is impossible to describe adequately the superb variety of its tints and the wonderful way in which they change as the sun sinks behind the western Andes. I hope that some day a great painter will come here and put on canvas the marvelous hues of this world-renowned hill. Pink, purple, lavender, brown, gray and yellow streaks make it look as though the gods, having finished painting the universe, had used this as a dumping ground for their surplus pigments. In reality, the hand of man has had much to do with its present variegated

FIG. 2—View from the Prefect's window in Potosí showing both the old and the new Plaza, the Cathedral and the theatre.

aspect, for he has been busily engaged during the past 300 years in turning the hill inside out. Much of the most beautifully colored material has been painfully brought out from the very heart of the hill through long tunnels, in man's effort to get at the silver and tin which lie within.

The discovery of silver at Potosí was made by a llama driver about the middle of the 16th century. It was soon found that the mountain was traversed by veins of extremely rich ore. After the gold of the Incas had been gathered up and disposed of, Potosí became the most important part of all the Spanish possessions in America. At the beginning of the 17th century, when New York and Boston were still undreamed of, Potosí was already a large and very wealthy city. It attracted the presence of hundreds of Spanish

adventurers, including many grandees. In short, it had taken on all the signs of luxury that are common to big mining camps. Grandees in sumptuous apparel rode gaily caparisoned horses up and down the stony streets, bowing graciously to charming ladies dressed in the most costly attire that easily gotten wealth could procure. On feast days, and particularly on national holidays like the King's birthday, elaborate and expensive entertainments were given.

If it were not for the wide expanse of ruins and the very large number of churches, it would be difficult to realize that this was ever the largest city in America. The routes which led to the Bolivian plateau became the greatest thoroughfares in America. Money flowed more freely than water. In fact, the Spaniards found considerable difficulty during the dry season in supplying the city with sufficient quantities of the latter commodity to use in washing the ore and in meeting the ordinary needs of a large population. Consequently, they went up into the hills above the city and built, at great expense, a score of dams to hold back the water that fell during the rainy season and preserve it for the dry.

Immediately following the Wars of Independence and the consequent opening of the country to foreign capital, a wild mining fever set in among London capitalists. Greedy and ignorant directors took advantage of the cupidity of the British public to enrich themselves, while incidentally working the mines of Potosí with disproportionately expensive establishments. So eager was the public to take stock in Potosí that shares which at the outset were quoted at 75 or 80, rose incredibly in the short space of six weeks. Some of them went up above 5,000. As was to be expected, this speculative fever was followed by a panic which ruined not only the stockholders but those unfortunates like Edmund Temple, who had gone to Potosí in the employ of one of the wildcat companies, and those South Americans that had honored their drafts on London. Then followed a long period of stagnation. But as railroads came nearer and cart roads began to multiply, transportation became cheaper and new enterprises sprang up.

Any one is at liberty to secure a license from the proper authorities to dig a mine in the side of the mountain, provided he does not interfere with the property of some one else. The records show that since the Cerro was first discovered over 5,000 licenses have been issued. It is easy to imagine what a vast underground labyrinth exists beneath those many-colored slopes. Most of the openings, however, have been closed by avalanches of refuse from excavations higher up the hill.

One day I was invited to visit several new mines that had recently been opened by a Chilean Company. In one, at an altitude of about 15,000 feet, I undertook to crawl into the depths for 500 yards in order to see a new vein of silver ore that had recently been encountered. The exertion of getting in and out again was terrific, yet the miners did not appear to feel it. They wear thick knitted hoods which save their heads from the bumps and shield them from falling rocks. Their knees are protected by strong leather caps. Their feet they bind in huge moccasins. Those that carry out the ore frequently wear leather aprons tied on their backs. The work-

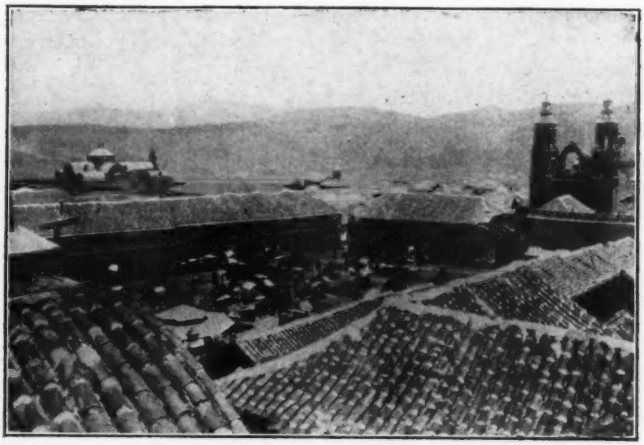

FIG. 3.—The Market Place from the roof of the Mint.

men are a sordid, rough-looking lot, who earn, and deserve, very good wages. Some time ago, when tin was higher than it is now, a large number of new projects were begun and unheard-of prices were paid for labor. Now that the price of tin has fallen, it is extremely difficult to get the Indians to accept a lower scale of wages. Consequently, most of the new mines have had to be abandoned.

In the old days, the tin was discarded as the eager Spanish miners thought only of the silver. But now the richer veins of silver have become exhausted, and although some are being worked, most of the activity is confined to the tin ore. At the top of the cone there is an immense quantity of it, the only difficulty being to get it down to the smelters in the valley between the hill and the city.

In this ravine runs a small stream of water that comes from the

Spanish reservoirs. Attracted by its presence, most of the smelters have located themselves on one side or the other of the little gorge. There are innumerable small *ingenios* worked by the Indians in a very primitive fashion. Some of them are scarcely more than a family affair. Besides these there are twenty-eight large smelters, all of them devoted more to tin than to silver. Not one is owned by a Bolivian. A few belong to English capitalists, more to Chileans, and the largest of all to a Frenchman who has constructed an aerial railway to bring the ore from high up on the mountainside to his furnaces. The never-ending line of iron buckets adds a curiously modern note to the ruins over which they pass. Ore is also brought down in sacks on the backs of donkeys and llamas.

The workmen are mostly Quichuas. Some of them are evidently not city bred, for they dress with the same pigtails and small clothes that they wore when Spanish *conquistadores* forced them to take the precious metal out of the hill without any thought of reward other than the fact that they were likely to die sooner and reach heaven earlier than if they stayed quietly at home. The product of this smelter is shipped both as pure tin, in ingots, and also as highly concentrated and refined ore.

The most picturesque feature of the valley was a small chimney smoking lustily away all by itself, high up on the opposite hillside, like a young volcano with a smokestack. In order to get a good draft for the blast furnaces, the smoke is conducted across the stream on a stone viaduct, enters the hill by a tunnel and ascends a vertical shaft for 150 feet to the chimney, which then carries it 30 feet further up into the air. The tunnel does just as good work in the way of producing a draft as though it were a modern brick chimney 200 feet high, but the effect is uncanny, to say the least.

We found among the boarders at the Hotel Colon a group of young Peruvian and Chilean mining engineers, who were very congenial. They made the best of their voluntary exile, and although none of them enjoyed the fearful climatic conditions, they managed to make their surroundings quite tolerable with hard work, cheerful conversation, birthday dinners, and social calls.

The courtyard of the hotel was a good example of the prevailing mixture of old and new. The roof was covered with beautiful large red tiles, whose weight had crushed down the rafters in places so as to produce a wavy effect. Meanwhile, the shaky balcony that ran around the court connecting the rooms on the second floor was sheltered from the rain by strips of corrugated iron! The stone-paved patio was marred by a vile wainscoting painted in imitation of

cheap oil cloth. In one corner stood a little old-fashioned stove, where *arrieros,* who have to make an early start, cook their tea without disturbing the hotel servants. An archway, running under the best bedrooms of the second floor, led out to the street. Another archway led in to the filth of the backyard, where, amid indescribable scenes and smells, six-course dinners were prepared for our consumption. It was a miracle that we did not get every disease in the calendar.

Opposite the hotel was a fine old building, with a wonderfully carved stone gateway and attractive iron balconies jutting out with

FIG. 4—Potosí Tin in Ingots.

stone supports from each second-story window. It is now the residence and warehouse of one of the largest importers in Bolivia. Once it was the abode of a Spanish marquis. The exquisitely finished exterior bears witness to the good taste of its builder and the riches and extravagance that once ran riot here.

So also do the beautiful stone towers, all that are left standing of the Jesuit church. The church itself has disappeared, but the solidly constructed, exquisitely carved towers remain as silent witnesses to the power of that Christian Order that did most to advance the cause of civilization in South America.

Unquestionably the most picturesque part of Potosí is the market-place and the streets in its immediate vicinity. Hither come the miners and their families to spend their hard-earned wages. Here can be purchased all the native articles of luxury: coca, *chupe,*

frozen potatoes, parched corn and *chicha* (native hard cider, made from anything that happens to be handy).

The streets are lined with small merchants who stack their wares on the sidewalk against the walls of the buildings. There are no carriages and few horseback riders, so that one does not mind being crowded off the sidewalks by the picturesque booths of the Quichua vendors.

In the streets flocks of llamas driven by gaily dressed Indians add a rare flavor not easily forgotten. The llamas move noiselessly, only making little grunts of private conversation among themselves, quite haughty yet so timid withal, they are easily guided in droves of fifty by a couple of diminutive Indians.

To see these ridiculous animals stalking slowly along, looking inquisitively at every one, continually reminded me of Oliver Herford's verses about J. W. Beane in Boston who

> "Looked about him with that air
> Of supercilious despair,
> That very stuck-up people wear
> At some society affair
> When no one in their set is there."

In the immediate vicinity of the market-place every available inch on each side of the street is used by the small tradesmen. They are allowed to erect canopies to protect their goods from the sun and rain and the general effect is not unlike an Oriental street. On one corner are piled bolts of foreign cloth, their owners squatting on the sidewalk in front. On another corner, leaning against the white-washed walls of a building, is a native drug store. The different herbs and medicines exposed for sale in the little cloth bags are cleverly stacked up so as to show their contents without allowing the medicines to mix. The most conspicuous article offered for sale is coca, which is more to the Quichua than tobacco is to the rest of mankind.

The market-place itself is roughly paved with irregular stone blocks and is surrounded by arcades where are the more perishable European goods. The vendors of Indian merchandise squat on the stones wherever they can find a place and spread out before them their wares, whether they consist of eggs or pottery, potatoes or sandals. It is the custom to arrange the corn and potatoes in little piles, each pile being worth a *real,* about four cents in our money, the standard of value in the market-place. Under umbrella-like shelters are gathered the purveyors of food and drink, their steaming cauldrons of *chupe* surrounded by squatting Quichuas, who can thus get warmed and fed at the same time.

The Quichua garments are of every possible hue, although red predominates. The women dress in innumerable petticoats of variegated materials and wear warm, gaily colored shawls, brought together over the shoulders and secured with two large pins, occasionally of handsome workmanship, but more often in the shape of spoons. Generally, they are content with uninteresting felt hats, but now and then one will have a specimen of a different design, the principal material of which is black velveteen, ornamented with red worsted and colored beads. On their feet the women usually wear the simplest kind of rawhide sandals, although, when they can afford

FIG. 5—Just outside of Potosí.

it, they affect an extraordinary footgear, an arched sandal with a French heel an inch and a half high, and shod with a leather device resembling a horseshoe.

Near the market-place is an interesting old church, its twin towers still in good repair. Services are rarely held here, and it was with some difficulty that we succeeded in finding the sexton, who finally brought a large key and allowed us to see the historical pictures that hang on the walls of two of the chapels. They are of considerable interest and appeared to date from the 16th century. We commented on the fact that a large painting had recently been removed and were regaled with a story of how a foreign millionaire had bribed some prelate or other to sell him the treasured relic!

In the 18th century Potosí boasted of sixty churches, but of these

considerably more than half are now in ruins. The abandoned portion of the city lies principally to the east and south. A few strongly built churches or church towers are still standing amid the remains of buildings that have tumbled down in heaps. Several of the old convents and monasteries, however, are still in a flourishing condition. To us the chief interest consisted of their collections of paintings and their beautiful flowers. Nothing was more refreshing in this mountainous desert than to walk in these sweet smelling gardens.

The principal object of interest in the city, however, is the Casa Nacional de Moneda, the great mint, which was begun in colonial days to receive the plunder that the Spaniards took out of the hill

FIG. 6—Llamas in the streets of Potosí.

by means of the forced labor of their Indian slaves. It extends over two city blocks, and is really a collection of buildings covered by a massive roof and surrounded by a high wall with only one entrance. The front is striking. At regular intervals along the roof are little stone ornaments like funeral urns. The few windows are carefully guarded with iron bars. On either side of the elaborately decorated façade of the two-storied portal are wooden balconies, over which projects the heavily timbered roof covered with large red tiles.

As one enters the great building from the street and passes between massive doors into a large courtyard, the first thing that attracts one's attention is an enormous face, four feet in diameter, which looks down at the intruder from over the archway that leads

to a second courtyard. The gigantic face has a malicious grin, yet bears a distinct resemblance to Bacchus. Who put it here and what it signifies, does not seem to be known. Suffice it to say that many of the Quichuas before starting on a journey, come to this courtyard and make obeisance to the face, throwing down in front of it a quid of coca leaves just as they used to do to the rising sun in the time of the Incas.

The courtyard is surrounded by an arcade with heavy arches, over which runs the carved wooden balustrade of the second story balcony. In the second patio, which is also paved with cut stones, a tiny narrow-gauge railway is used to carry silver ingots from the treasure room to the stamping machines. In one of the buildings is a physics laboratory. In another a little gymnasium. In still a third, a collection of minerals. All of which are evidences that here are the beginnings of a school of mines that is being developed under the able direction of an intelligent young Bolivian engineer who received his training at Notre Dame University in the United States. In another old building are still standing the great wooden machines that were formerly used in the process of hammering out the silver. In a large room on the second floor of still another are kept the vellum-bound records of the mint and all the dies which have been used for the past 200 years. According to the records, the silver taken from here in the colonial days amounted to about two billion ounces. Most of the stamping was done by hand. The Bolivian Government has cleared out two or three of the structures and installed modern machinery, imported from the United States.

One of the most remarkable features of the mint is the size and condition of the huge timbers that support the roof. They are as sound to-day as they were 200 years ago, when, with infinite labor, they were brought across the mountains from the distant forests of the Chaco.

The roof is surmounted by a number of small sentry boxes, which are connected by little paths and stairways that lead to all parts of the structure. In the old days, it was necessary not only to protect the "Money-house" against possible attacks from without, but to make sure that the Indians, who were assigned to work in the mint, did not escape from the attics where they slept at night.

I crawled through several of these attics where not even an underfed Quichua could stand upright. The roof was scarcely four feet above the floor. In the corners were rude fireplaces where they may have cooked their *chupe,* with dried llama dung as their only fuel. The rooms were dark, even in midday. The tiny peek-holes

that served as windows admitted scarcely any light. Altogether it was as wretched a dormitory as could possibly be imagined.

The view from the roof was very extensive. The romantic cone of the mountain-of-silver rises to the south beyond the graceful towers of the cathedral. East of it are the hills where the Spaniards built their famous reservoirs. Further east are higher hills which have been the scene of several bloody encounters in the unprofitable civil wars that have devasted Bolivia. Here on the battlefield of Kari Kari, several hundred unfortunate Indians, fighting for revolutionary leaders with whose selfish aims they had little sympathy, fell victims to the unfortunate habit of appealing to arms instead of ballots. North of us, in the foreground, is the picturesque market-place, while northwest, in the distance, the old trade route to Lima winds away through the barren hills. To the west the far extending vista discloses a wilderness of variegated hills and mountain ranges. While all around the quaint old arched roofs, rolling like giant swells of the Pacific, are surrounded by the narrow streets, the red tiled houses and the ruinous towers of this ancient and fascinating city.

GEOGRAPHIC INFLUENCES IN AMERICAN SLAVERY

BY

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"American History is largely the record of the adjustment of a migrating people to their environment."* The colonists came mostly from North Europe bringing with them a well-developed civilization into a virgin country of varied topogoraphy and resources and a climate ranging from sub-tropical to cold temperate. Their institutions, customs, laws, habits, in short, their civilization adapted themselves to their new environment. The earlier colonists were largely British and their common inheritance gave a unity to their civilization as it developed in different geographic environments. Had North America, north of the Ohio, been settled from North Europe, and the South been occupied by immigrants from Southern Europe, it is safe to say that both from differences in racial inheri-

* Ulrich B. Phillips: "A History of Transportation in the Eastern Cotton Belt," New York, 1908, p. 1.

tances and from different geographic environments, two very different civilizations would have sprung up in the United States.

Slavery was one of the institutions having an early beginning in the colonies and an existence prolonged to recent times. It was primarily economic in its development, or in other words, the institution thrived and developed in the areas where it paid the best. Its spread was conditioned largely by the geographic factors of soils, topography and climate. Other factors existed of course, some easily recognized and others difficult of analysis. Religious beliefs,

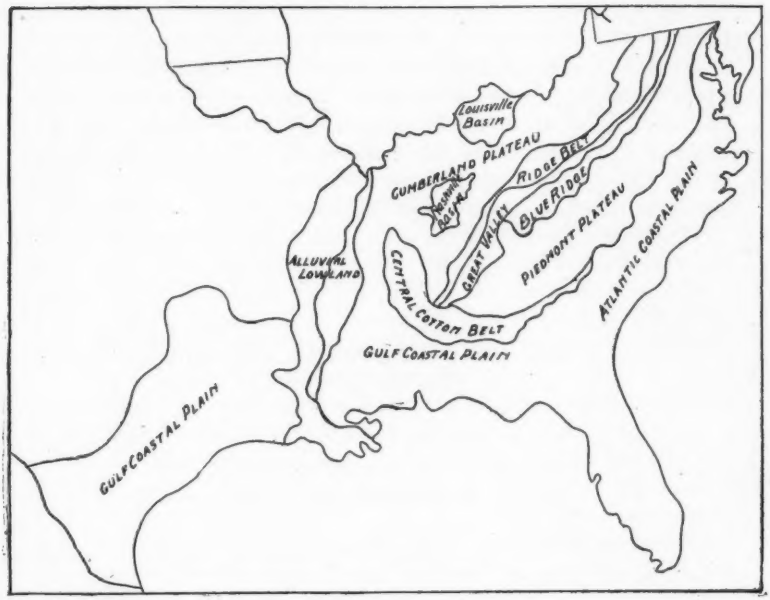

FIG. I.

the systems of land tenures, customs, prejudices and many other factors influenced the spread of slavery. But the notable extension of the institution was in areas whose geographic conditions favored the growth of crops to which slavery could be well adapted.

The purpose of this paper is to trace from the geographic standpoint the development and extension of slavery. The paper will necessarily include a discussion of the factors of the institution, a general survey of the South where the institution became characteristic, and a consideration of those areas in the South in which

slavery expanded and reached its most notable development. The discussion is more definite after 1790 because then the census returns became available; it is more complete from 1810 to 1860 because slavery had its greatest expansion and development in those decades.

Slavery arose in the colonies from an economic need. Land was cheap and plentiful, the ordinary necessities of life were easily obtained, but labor was scarce.* Wages were high, land was cheap or practically free, and there was a constant inclination on the part of the wage earner to take up new land, become a freeholder and own his own home. A few cleared acres would support his family and his cabin was easily erected.

Thus there arose a demand in all the colonies for enforced labor, but this demand was especially insistent in South Carolina and

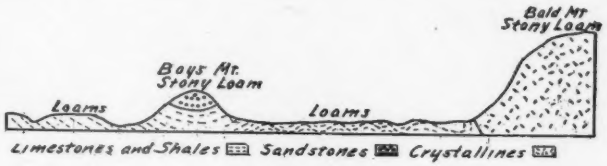

FIG. 2.

Section near Greenville, Tenn., in the Eastern part of the Ridge Belt. Bald, Mt., is a part of the Blue Ridge System. (From the Greenville Folio, U. S. G. S., and the U. S. Soil Survey of the Greenville Area.)

Georgia where the white laborer could not without danger endure the hard labor in the low malarial coast region which was, in colonial times, the principal area of population. The old law of war that made the captives slaves was early invoked in all the colonies with respect to the Indian and very early the system of white servitude was introduced from England. At best the Indian made a poor laborer. He was intractable and, if successfully retained as a slave, he did not long survive hard labor. The indentured white laborer served but a limited time and then became a freeman. In both of these servile types the owner's control was somewhat precarious.

Negro slavery was introduced largely as an experiment and its success even in the South was not assured for nearly fifty years† The negro slave proved far superior to the Indian or the indentured white. He was tractable, capable of hard work, hardy, and easily and cheaply maintained. He could endure heat and malarial con-

* U. B. Phillips: "The Economic Cost of Slave Holding," *Pol. Sci. Quar.*, Vol. 20, 1905.

†J. H. Bassett: "Slavery and Servitude in the Colony of North Carolina," Johns Hopkins University Studies, Vol. 4 1896.

ditions. On the other hand he has many inherent disadvantages. He was stupid and incapable of little but simple routine labor. Having learned the care of one crop, it was with difficulty that he could be taught the culture of another. His labor was more or less unwilling, and this, combined with his unintelligence, made necessary a close supervision of his work.* Slave labor must be organized and the slaves worked in gangs. It soon came about that the owner of a considerable number of slaves had an economic advantage over the owner of a small number; and out of this fact and the factor of cheap fertile lands, the plantation system developed.

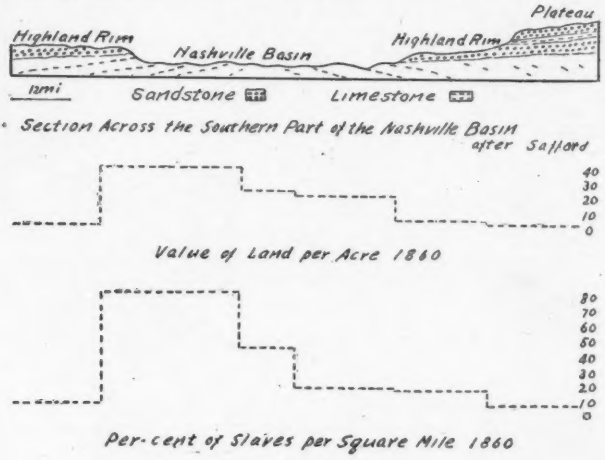

FIG. 3.

Profile, section and graphs of the southern part of the Nashville Basin.

The negro slave, then, was not available for all industries. He was never largely employed in anything but agriculture, and even in this he was restricted to certain crops. The ideal slave crop would have its cultivation extended well over the year, since slave labor was not versatile enough to be employed at different crops or to take up other work between crops. The cultivation must be simple and intensive enough so that the labor could be thoroughly supervised. If at any of its stages the women and children could be employed, that was a great advantage. Finally the output must be of considerable value since slave labor and the attendant poor methods of agriculture were, in the long run, expensive.

The principal crops fulfilling in various degrees these require-

* J. E. Cairnes: "The Slave Power," London, 1863.

ments were tobacco, indigo, rice, cotton and sugar. All of these staples require a fertile soil, abundant rainfall, and, except tobacco, a warm temperature. While tobacco could be raised in the North it never became a very large crop there. In the North the capitalist and *entrepreneur* turned toward commerce and manufactures, while in the South they found a promising field in agriculture. In the North the slave was largely a family servant instead of a field hand, and was unimportant in the life of the people. He had not the adaptability or intelligence to take a place in the varied industries of this region, and crops to which slave labor was adaptable were not profitable in the North. Consequently by the time of the revolution, slavery was nearly extinct both by custom and legislation in the states north of Maryland.

The institution then was economically excluded from the colonies north of Maryland. The ordinance of 1787 fixed the Ohio River as its northern boundary, west of the Alleghenies and east of the Mississippi, and the compromise of 1820 practically held it at the northern boundary of Missouri. South of these boundaries slavery could legally expand. In some places it became dominant, and elsewhere it was practically unknown. The factors of soil and climate which dominated the slave crops, and the factor of topography which markedly influenced the soil, and also in a greater degree the means and routes of transportation, all these factors likewise controlled the extension of slavery. The principal physiographic and climatic areas will first be briefly described, and the somewhat detailed descriptions of these various areas, together with the development of slavery therein, will follow the general description.

The principal physiographic provinces included in the slave states are the Coastal Plain, the Piedmont Plateau, the Blue Ridge, the Great Valley, the Ridge Belt, the Cumberland Plateau, and the Mississippi Alluvial Lowland. (Fig. 1.)

The Coastal Plain slopes gently from the Piedmont to the Atlantic and Gulf of Mexico. It is an upraised sea-bottom which continues beneath the Atlantic to the Continental Scarp. The sediments comprising the Coastal Plain are mostly unindurated and dip seaward at a low angle. Sand and clay are its principal constituents, although in places there is limestone. The inner margin of this division rises on the average from 100 to 200 feet above sea level. As one passes from the sea inland, the lower portion of the Coastal Plain is so level as to appear flat, but as the inner margin is reached there is considerable dissection and the surface is rolling and rough.

The entire shore of this division, especially in the north, has been

drowned with the result that the broad tidal estuaries reach well into the land and, in Virginia and Maryland, they often extend to the Piedmont. The rivers in the Coastal Plain have a low slope, are sluggish and often tidal. The larger streams are navigable well toward the Piedmont, a fact of no small importance in the development of this region. Along the shore from Virginia to Florida is a discontinous line of off shore bars which are especially well developed off the North Carolina coast.

If the soils of the Coastal Plain were simply derived from the underlying rock, we would have a series of sub-parallel soil belts corresponding to the outcropping strata that compose the Coastal Plain. This holds true in some instances that will be mentioned later, but the greater part of this division is overlain by a veneer of sands

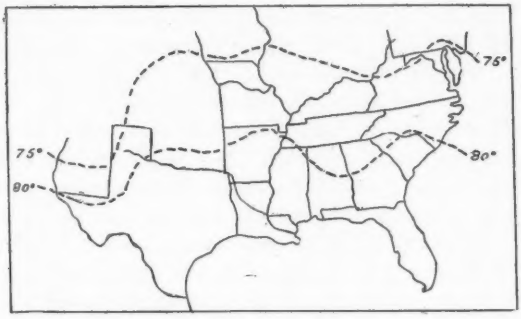

FIG. 4.
Average Temperatures for July.

and loams of the Lafayette and Columbia formations whose precise origin is as yet unsettled. While there are clays and silts found in these formations, they are predominantly composed of sands and sandy loams. The silt and clay areas are best developed in the Gulf Coastal Plain.* The characteristic soils of the Coastal Plain are therefore sandy.† Such a soil is warm and stimulating but easily exhausted. The sluggish rivers are commonly flanked by flood plains, which, when they can be drained, are very fertile.

The Piedmont Plateau forms the inner boundary of much of the Coastal Plain. In general the junction of these two divisions is marked by a low though somewhat persistent slope. The streams flowing over this junction commonly descend in falls or rapids, thus

* W J McGee: "The Lafayette Formation." 12th *Annual Report* of the U. S. Geol. Surv., 1890-91, Part. I. McGee's paper is the most complete report of these formations yet published.

† "Soils of the United States." *Bull.* No. 55, U. S. Soil Survey, 1909.

giving the name "Fall Line" to this slope, a feature that has marked influence in transportation and the location of towns. Back of the Fall Line, the Piedmont slopes gently upward to the Blue Ridge.

In contrast with the Coastal Plain, the rocks of the Piedmont are largely crystalline and relatively hard. The surface is moderately dissected so that the term "rolling" is often applied. As the Blue Ridge is approached the dissection becomes greater and the country more mountainous.

The soils of the Piedmont are largely residual, being derived from the granites, schists, gneisses, slates, etc., which underlie the division. Such rocks in weathering yield sand and clay. Piedmont soils therefore contain a higher content of clay than do those of the Coastal Plain, and vary from heavy clays through loams to sandy-

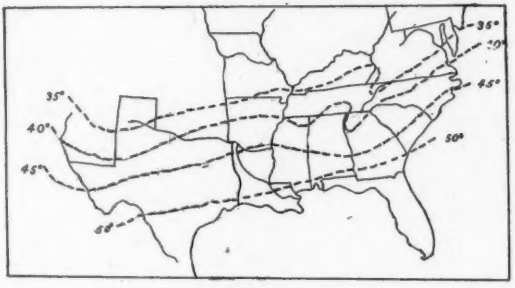

FIG. 5.
Average Temperatures for January.

loams. These soils are in general retentive of moisture, they contain considerable humus, and are far less easily exhausted than are those of the Coastal Plain.

The Blue Ridge, like the Piedmont Plateau, is a mass of crystalline rocks. It lies to the west and northwest of the Piedmont and has an altitude considerably above that of the latter. In horizontal outline it is club-shaped with the smaller end on the Potomac. (Fig. 1.) Near the Potomac the Blue Ridge has an altitude of 1000 feet and it rises to an average altitude of 3000 to 4000 feet in its southern portion. In the northern part there are frequent wind and water gaps that afford easy access from the Piedmont to the Great Valley. In the southern portion are several intermontane valleys encircled by high mountains, the largest of these being the Ashville Basin on the upper French Broad River.

The soils of the Blue Ridge are derived from the same kinds of rocks as are most of the Piedmont. However, the thorough drain-

age consequent upon the steep slopes leaves much of the region with thin soils. In the intermontane valleys a deep fertile soil has often accumulated. The elevation of the Blue Ridge gives it a somewhat more severe climate than that of the Piedmont or the Coastal Plain in the same latitude.

The Great Valley and Ridge Belt extend from New York to Alabama. Here the rock is sedimentary and is folded. The harder strata, mostly sandstone and siliceous limestone, are left projecting as ridges, while the softer limestones and shales are etched by erosion into valleys, (Fig. 2.). The Great Valley is a long structural valley forming the eastern boundary of the Ridge Belt. The Shenandoah River flows along the Great Valley in Virginia and the Tennessee River, in Kentucky and Tennessee. West and north of this division

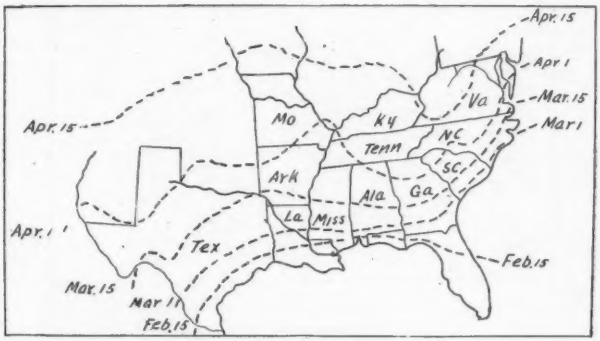

FIG. 6.
Average Dates of last Frosts in Spring.

is the Ridge Belt. Long, narrow ridges, broken by wind gaps and water gaps, alternate with narrow valleys. The soils of the ridges, both from the composition of their rocks and from their steep slopes, are naturally unfertile. The valley soils, derived largely from limestones and shales, are generally fertile. (Fig. 2.) The Great Valley with its long reaches of level floor and fertile soils, is an important agricultural province.

The folded rocks of the Ridge Belt grade into the approximately horizontal rocks of the Cumberland Plateau, from which it is usually separated by a prominent escarpment. The Cumberland Plateau slopes gently north-westward and westward, and merges into the Ohio Basin. The western part of the Plateau is overlain by carboniferous limestone which affords fairly fertile soils. The central and eastern Plateau is overlain by sandstone and underlain

by limestone. The sandstone covers much of the Plateau, except in some of the deeper valleys which have been eroded to the limestone and along a low anticline that extends from Ohio into Tennessee. In places along this anticline the overlying sandstone has been eroded leaving the Louisville Basin in Kentucky and the Nashville Basin in Tennessee floored by limestone. There are few better examples than these showing the influence of the underlying rock upon the soils, and, in turn, the influences of these various soils upon the inhabitants. Without the Basins the soil is sandy and rather sterile; in the Basins the prevailing limestone soils are very fertile. The graph in Figure 3 brings out these contrasts in soil values.

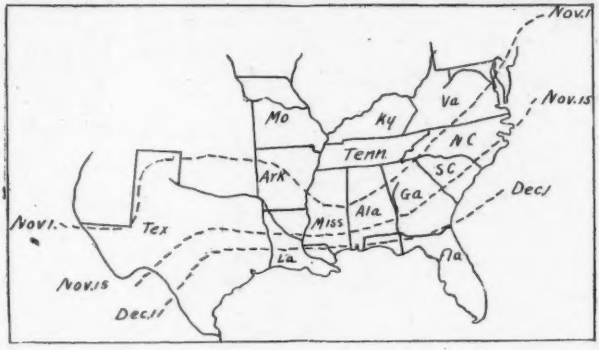

FIG. 7.
Average dates of first frosts in Autumn.

Such then were the various physiographic divisions in which slavery was allowed to develop. Various minor divisions and details have been left to be considered later in connection with their appropriate areas.

A geographic factor even more vital than physiography and soils is climate. A given type of fertile soil, alluvium for example, is widely distributed, but the crops obtained therefrom are closely conditioned by temperature and rainfall. The climate of the South, with the possible exception of Florida, is essentially continental. It is characterized by sudden variations and the contracts between winter and summer are considerable, such contrasts becoming more marked in the northern and western portions.

So far as the temperatures are concerned, the climate of the South is mild and even warm. The summers are hot and the winters are moderate. (Figs. 4 and 5.) The higher elevations of the Blue

Ridge and Cumberland Plateau somewhat depress the isotherms, but most of this section has a moderate or low relief.

However, the crop possibilities are sharply conditioned by spring and autumn frosts. The growing season of most crops is included between the latest frosts in spring and the earliest in autumn. This is especially true of the principal slave crops, tobacco, rice, sugar and cotton. Figs. 6 and 7 show a rough division of the South into two frost provinces. Virginia, North Carolina, Tennessee and Kentucky have a growing and harvesting season of about seven months, while the rest of the South has a considerably longer season. The rainfall of the South is in general ample for all crops and is well dis-

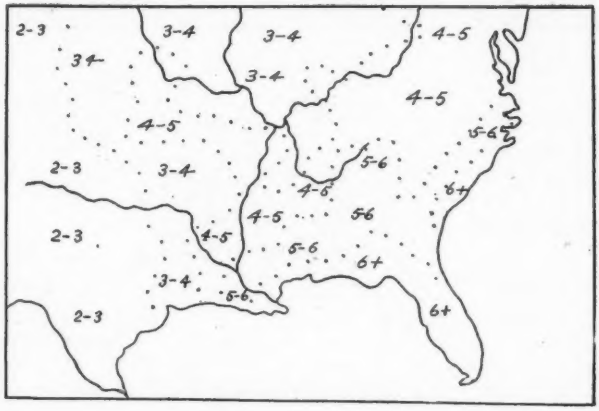

FIG. 8.
Average Rainfall for July (in inches).

tributed during the crop growing seasons. (Figs. 8 and 9). Most of the South has a mean annual rainfall of from 40 to 60 inches with a minimum in the autumn. Southern Louisiana, Mississippi and Alabama have a high annual rainfall and also a high autumnal rainfall.

Like colonization by the whites, the institution of slavery first began at the coast region, that is to say, at the eastern margin of the Coastal Plain. Its earliest development was in eastern Virginia, South Carolina and Georgia, since these regions were easily accessible and near the slave marts of the West Indies.* North Carolina was settled later in large part by migrations from the adjacent col-

*W. E. B. DuBois: "Suppression of the Slave Trade." Harvard Historical Studies, 1904.

onies.* This deferred settlement of North Carolina was mainly a response to the character of the coast, which is largely fronted by long off shore bars, the inlets through which were shallow and shifting, while the smooth coast offers no good harbors except in the southern part of the state at Wilmington. (Fig. 10.)

It was on this eastern seaboard that the two main slave regions which persisted to the end of the slave period were initiated. We have noted that the slave crops determined the expansion of slavery. These crops have rather sharp climatic limits, the principal conditioning factor of which is frost although the other climatic factors are not unimportant. Tobacco was the principal slave crop in that

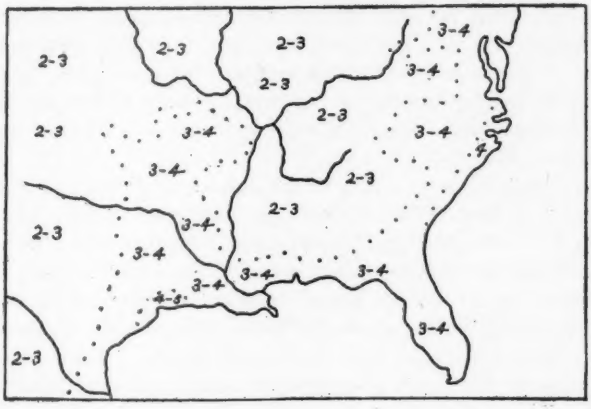

FIG. 9.
Average Rainfall for October (in inches).

part of the South which had a mild climate and short growing season, while rice, cotton and sugar require a longer growing season and a hotter temperature. Virginia, much of North Carolina, Kentucky and much of Tennessee became and continued a tobacco growing region with cereals and live stock as subsidiary products. The rest of the South was ultimately given over for the most part to cotton, rice, and sugar. The *ante bellum* terms "Tobacco South" and "Cotton South" have therefore a geographic significance. They denote the two main areas into which slavery expanded and in which, largely for geographic reasons, the institution acquired conditions somewhat characteristic. The geographic expansion of slavery,

* Bassett, *op. cit.*

therefore, will be discussed mainly with reference to these two crop districts, although, of course, they were not closely delimited from each other.

The tobacco plant is a flowering annual which will grow under a somewhat wide range of climatic conditions. It is a native of the tropics but it can be grown in a temperate climate. The ordinary varieties thrive best in a warm, fairly moist climate and on a fertile, loamy soil. More than most others, the crop quickly impoverishes a soil. In colonial times, at least, tobacco was not grown for export north of Maryland.

The culture of tobacco is necessarily intensive and demands careful attention at each stage. At least seven different operations are demanded during the growing and harvesting season. The seed bed is carefully prepared and the plants are set. The crop must be ridden of worms and pests. Superfluous "suckers" must be pulled off and the plants "topped" or cut back. Finally comes the picking, curing and packing. Meanwhile the soil must be cultivated and the weeds kept down.*

In its growing stage much of the culture is simple and does not demand hard work. While the stronger slaves were hoeing and cultivating, the women and children could pick the worms from the plant.† Tobacco was therefore especially suited to slave labor.

The culture of tobacco began, of course on the Coastal Plain in Maryland and Virginia where the fresh soils generally yielded good crops. During colonial times there was usually a brisk European demand and the home government's policy favored tobacco culture.‡ Slavery was therefore profitable and yielded quick returns on the investment. Both by the crop demands and by the continuous planting of tobacco without crop rotation, the sandy soils of this region were quickly impoverished. Land was so cheap and abundant that it was cheaper to take up and clear new land than to improve the old. Tobacco culture, therefore, together with its accompanying system of slave labor, moved westward leaving sand wastes in place of the fertile soil that had been deprived of its humus.

By 1790 slavery was well established on the Piedmont but still there was a dense slave population on the Coastal Plain, a population which, on the whole, increased up to 1820. The succeeding maps show a rather rapid movement of the slave population to the

*Myer Jacobstein: "The Tobacco Industry in the United States." Columbia Univ. Studies in History, Economics and Public Law, Vol. 26, No. 3, 1907.

†Cairnes, *op. cit.* ‡Jacobstein, *idem.*

FIG. 10.

The Coast of North Carolina. (From maps of the U. S. Coast and Geodetic Surv.)

Piedmont and a progressive increase in this division from the North southward; a kind of slave wave, so to speak, passing southward. The small planters and non-slave-holding farmers were forced westward. The migration of slave owners who were largely from the Tobacco South, is shown as early as 1800 when slavery was well organized in the Louisville and Nashville Basins. From about 1830 on, both the Tidewater Region and the Piedmont of Virginia became

a slave raising rather than a slave working region. By 1840, the Coastal Plain was largely given to the cultivation of cereals. Fig. 12.)

The Piedmont in North Carolina held its density up to 1850 and, in fact, well through the slavery period. This area was within the cotton belt and was also a notable tobacco district. The Piedmont soils endured the exhaustive tobacco cultivation much better than did those of the Coastal Plain.

(*To be continued.*)

RAILROAD DISTANCES IN NEW YORK

BY

A. E. PARKINS,
Michigan State Normal College, Ypsilanti.

Extending east and west across the State of New York, from Lake Erie almost to the Massachusetts boundary, between highlands to the north and to the south, is a narrow strip of land nowhere much over 500 feet above the tidewater. The east end of this depression opens out upon the valley of the Hudson, which runs almost at right angles and which even as far north as Albany is almost at sea level. This natural outlet for the traffic of the West has the greatest railway mileage, for its area, of any other region in the State, and perhaps in the United States. Along this route we see (Fig. 1) quite a number of roads extending for the most part parallel to each other, concentrating into a narrow belt in the Mohawk Valley, but again spreading out along the Hudson. Along this route the people are so well supplied with transportation facilities that in 96 per cent. of the area no point is more than five miles from a railway station. To the north in the Adirondacks the conditions are far different. Fig. 2 shows large areas more than five miles from a station, and the small black spot near the center of the large area shows that a portion is even more than twenty-five miles from any shipping point. To the south, for the most part, the patches are small though numerous. That means a larger number of railroads and a better distribution. In the Catskills, however, there is a thinning out of the railroads again as shown by the two areas that are more than ten miles from any station.

Using Tarr's* classification of the physiographic regions of the

* Tarr's "The Physical Geography of the State of New York," page 1.

State, estimating the areas of these regions and of the portions more than five miles and ten miles from a station, calculating the percentages from these figures and tabulating we have the following:

REGION.	TOTAL AREA.	MORE THAN 5 MILES FROM STATION. AREA.	MORE THAN 5 MILES FROM STATION. PER CENT.	MORE THAN 10 MILES FROM STATION. AREA.	MORE THAN 10 MILES FROM STATION. PER CENT.
Adirondack	17,000	6,900	41	3,000	17
Lake Plains	4,500	80	1.8	....	..
Mohawk	4,000	300	7.5	....	..
N. Y.-Penn. Plat.	14,000	1,400	10.	....	..
Catskills	4,200	1,400	33.	200	5
Taconic	4,300	230	5.	....	..
Gneissic Highland	1,000	10	1.	....	..
Long Island	1,000	10	1.	....	..
Total	50,000	10,330	20	3,200	6

The remarkably poor development of railroads in the Adirondacks and the Catskills comes out in this method of treatment. Over 40 per cent. of the area of that portion of New York between Lake Ontario and the eastern boundary is more than five miles from a shipping point. In the Catskill region the development of roads is almost as poor when areas are considered. Here the figures show that in 33 per cent. of the area there are no stations within five miles. The lack of railroads in these two regions is further brought out by the percentages shown in the last column of the table. Here we see that 17 per cent. of the area of the Adirondack region and 5 per cent. of the Catskill region are distant more than ten miles. The low percentage for the remaining regions of the State shows a better development. The low percentages for the regions along the Lake Plains and the Mohawk and Hudson River valleys are not surprising in view of the great development of railroads shown by Fig. 1. The larger percentage for the Mohawk region is perhaps due to the concentration of the roads along the Mohawk River and to the fact that the physiographic boundaries of this region are very indistinct,* so that portions of the Adirondack region on the north are classed as belonging to the Mohawk.

Topography has had a great effect in determining the distribution of the railroads in New York. The low pass offered by the Mohawk depression makes it the great transportation route for all time. Trail, wagon road, canal, and railroad followed each other. Each had its effect in bringing in industries and people. But the railroad has been and is the greatest factor. The increase in transportation facili-

* Tarr's "The Physical Geography of New York State."

ties offered by it has favored industries; more industries meant more people; and these in turn meant more railroads. Cause and effect here are reciprocal. These factors, human and natural, have concentrated railroads, industries, and people to such an extent that "four-fifths of the population and nine-tenths of the wealth of the Empire State are found within the countries bordered or crossed by the Hudson River and the Erie Canal." *

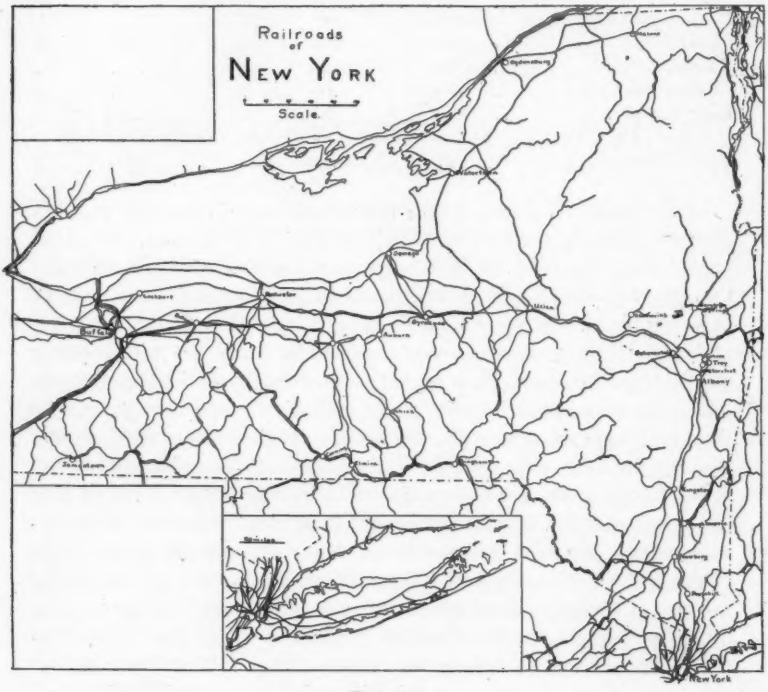

FIG. 1.

In the Adirondacks, topography has not been the sole factor, for while the highlands have had their effect, no doubt, the area more than twenty-five miles from a station is not in the highest part but far to the southwest, near Lake Pleasant in Hamilton County. This odd arrangement is due to the fact that the highest parts of the Adirondacks are the playgrounds of the wealthy New Yorker, and to reach these recreation grounds the railroads push out branch lines as

* Brigham, "Geographic Influences in American History."

far as topography will allow. From the northwest the Delaware and Hudson has projected a line as far as Lake Placid, within fifteen miles of Mt. Marcy, the highest point in the Adirondacks and about five miles from Whiteface Mountain. To reach this vantage point a branch from the main line alone the west shore of Lake Champlain has been carried around the north base of the Adirondack mountain pass. But for the summer passenger traffic, the railroad mileage in

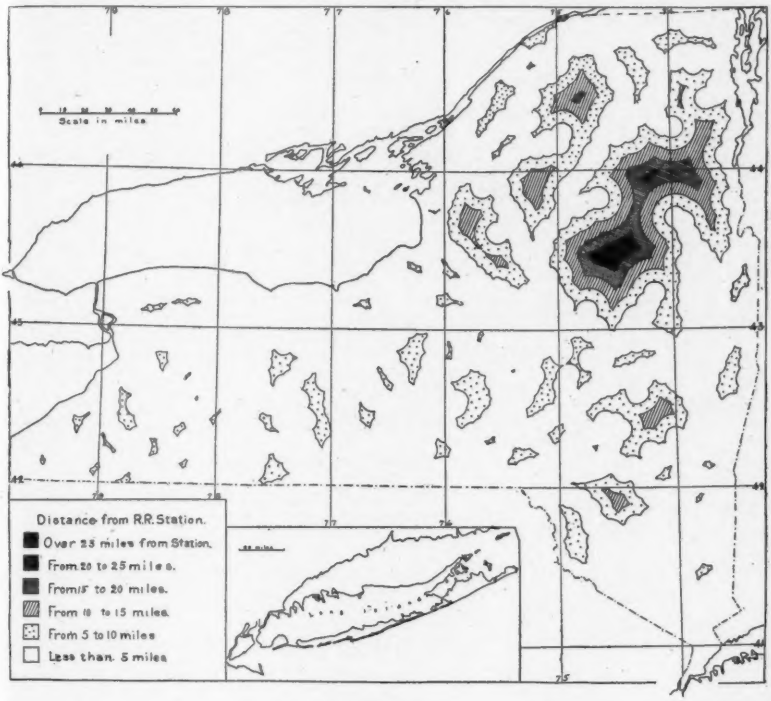
Scale in miles
Distance from R.R. Station.
Over 25 miles from Station.
From 20 to 25 miles.
From 15 to 20 miles.
From 10 to 15 miles.
From 5 to 10 miles.
Less than 5 miles.

FIG. 2.

the Adirondack region would be far less. Here human causes have served to counteract natural ones, but the natural have been the more effective. In addition to topography, two other causes may be cited as perhaps having a great effect in hindering railroad development, namely, thinness of soil and remoteness from east and west traffic. But in the southern part of the State, relief has the greatest effect.

The deep valleys and numerous hills in the Catskill region have

hindered railroad building, as they have in the New York-Pennsylvania Plateau, although not to such a great extent in the latter region. But even here the elevations reached and the grades that must be climbed are far in excess of those along the Mohawk route. The route over this plateau from Buffalo to New York is much more direct, yet we see no such development of railroads as shown by either accompanying map.

The principle of construction of this Railroad Distance map is not an original one. Tronnier* has recently published a map of northwest Germany in which he shows areas more than five kilometers, more than ten kilometers, and more than fifteen kilometers from a railroad. The boundary lines of the areas on his map are drawn parallel to the railroad at a distance of five, ten, or fifteen kilometers for each respective area. In the accompanying maps of New York the general plan of Tronnier's map has been followed, but instead of showing distances from the railroad the map shows distance from the railroad stations. The construction of such a map is a simple process. From the various stations shown in an official railroad map of the State, as centers, arcs are drawn having radii of five, ten, fifteen, twenty or twenty-five miles. The areas outside of the intersections of the five-mile arcs are more than five miles from the stations.

Taking the State as a whole only 20 per cent. of its area is more than five miles from a railroad shipping point and but 6 per cent. of the entire area is more than ten miles. Hence we may say that 80 per cent. of the people of the State of New York are living less than five miles from a railway station. It is south of a line from Albany to Lake Ontario that we have the greatest development of railroads. Over 90 per cent. of this area is less than five miles from a shipping point. In this region we find the greatest densities of population, more cities, more wealth per square mile, more schools, more colleges, and more of everything that indicates culture.

**Petermanns Mitteilungen*, May, 1910. "Eisenbahn Ferne von Nord Deutchland. Von Rich. Tonnier.

THE SPITZBERGEN EXCURSION OF THE INTERNATIONAL GEOLOGICAL CONGRESS

BY

PROF. R. S. TARR
Cornell University

Among the many excursions undertaken by the International Geological Congress at the Stockholm meeting last summer, none were more pretentious or more successful than the excursion to Spitzbergen. Boldly planned, skillfully managed, and successfully carried out in practically all of its details, it was a memorable expedition. On this trip the party saw Sweden from Stockholm northward into Lapland; they cruised along a large part of the Norwegian coast; and they spent a week in Ice Fiord in Spitzbergen studying the complex geological structure, and the glacial phenomena. The expedition was planned by Professor Gerard DeGeer, who accompanied it as director and who gave freely to us all from his vast store of knowledge. To him, and to his accomplished wife, each member of the excursion came away feeling a debt of gratitude. It was a wonderful opportunity to see an interesting and far away region under the guidance of one who knows it so well; and to discuss the problems not only with him, but with other geologists and geographers of wide experience and knowledge. There were about seventy in the party, representing some fifteen nationalities, and including such well-known geologists as Credner, Penck, Wahnschaffe, Rothpletz, Keilhack, Saloman, Sapper, de Margerie, Madsen, and Reusch. English-speaking geologists were few in number, for there were but three from the British Isles—Cole, Lamplugh, and Strahan; one from Canada—Coleman; and four from the United States, these being, in addition to the writer, Miss Bascom of Bryn Mawr, and Miss Baker and Miss Rice of the University of Chicago.

It is difficult to select from among the multitude of observations with which each day was crowded, those which, because of their special noteworthiness, deserve mention in a brief note such as this. Surely all were impressed, in Sweden, by the clear evidence that from an ice center in that country the continental glacier spread westward, ascending the Norwegian divide, and, in its waning stages, holding up extensive marginal lakes which outflowed to the Atlantic

across low passes in that divide. Impressive also was the record which Professor and Madame DeGeer have worked out, at Ragunda, of the time which has elapsed since the glacier receded from this part of Sweden. The diversion of the outlet of a large lake brought about its drainage; streams have dissected the lake and still earlier fiord sediments; and the annual layers there revealed have been painstakingly studied and counted, giving basis for an estimate in years of the time since the ice stood there. To many it was a surprise, and to all it was a matter of interest, to see the vast iron deposits at Kiruna in Lapland, and to observe in its Norwegian seaport, Narvik, the preparations for the shipment of this ore, which seems destined to play an important rôle in the iron industry of the world.

The quaint Laplanders, the beautiful fiord scenery of the Norwegian coast, the midnight sun, and the Arctic floe ice, were all new to most of the party and were a source of pleasure to all. But the great climax was Spitzbergen itself, where we had a week of busy days not bounded by sunrise or sunset, and some of them fully twenty hours long. Here we had the experience of gathering ferns and other Tertiary plant fossils from the moraines on glaciers; here we stood at the mouth of a coal mine, accumulated during a period of far more genial climate, and looked out over a waste of barren Arctic landscape and upon vast snow fields and glaciers from whose fronts icebergs were crashing into the sea. One could not wish for more convincing testimony of climatic change; it required only the slightest imagination to picture this desolate land the seat of luxuriant vegetation which is now forbidden it.

The geologic structure, in which rocks of almost every age from early Paleozoic to Quaternary are involved, and in various attitudes and relationships, with faults, folds, igneous intrusions, and unconformities, is revealed in almost diagrammatic simplicity in the steeply rising walls of the branching fiord, every branch of which we visited with frequent landings, and with convincing expositions from our leader. The topographic forms were a source of great interest to the physiographer for we found here a rock structure quite unlike that of well known regions of former glaciation. The processes and results of glacial erosion exhibited here were, therefore, new to most of us, and the phenomena were masked by the extensive gullying and talus deposit to which the steep slopes of horizontal or slightly inclined sedimentary strata had been subjected. There had developed a topography strikingly simulating that of an arid plateau region, like that of southwestern United States; the climate of Spitzbergen

is, in fact, an arid climate. To me, of all the phenomena observed, those of the glaciers were of most interest, but I shall resist the temptation to dwell upon the many features of importance which they present. We are promised a full report on these glaciers by Professor DeGeer, who has studied and mapped them on his several expeditions.

Our little steamer left Ice Fiord under steam generated by Spitzbergen coal, and with it made its way to Norway. The islands are to-day a "No-Man's Land," but the presence there of extensive workable beds of coal in latitude 78° N. gives to this land, though far within the Arctic Zone, a new importance. Already, at the American coal mine, there is permanent settlement, and extensive development has been carried on. It was a wierd experience to find a "Longyear City" in this far northern land, to be conducted through a frozen coal mine by an American engineer, and to have a foreground of electric wires, and railway tracks with an ice cap background.

THE RUBBER WORKERS OF THE AMAZON

BY

A. LANGE.

In the State of Amazonas, excluding the City of Manaos, probably 150,000 men are directly occupied with the rubber trade. They are proprietors and workers. The proprietors, whether foreigners or Brazilians, have now adopted modern methods both in the working of the rubber and in its commercial manipulation. Not more than seven or eight years ago, the actual tapping of the rubber tree was conducted in such an unintelligent manner that enormous losses resulted through the killing of the trees. They are now tapped scientifically and the new method is enforced on all important rubber estates. Formerly the rubber was smoked with certain materials and in such a manner that the health of the operator was seriously affected after a few years' work. By the modern method no danger whatever is involved in the smoking process. Not only in the technical phases of rubber collecting but also on the business side of it they have improved their methods. They now, for example, employ expert bookkeepers, if not competent themselves in this line.

The proprietor living at a great distance from Manaos, often

suffers large losses through fluctuations in the rubber-market because the market quotations do not reach him for two to three months. Thus he may ship 10,000 to 15,000 pounds of rubber and, a month later, the news may come that a big drop in price has occurred. If he had known this he might have held his rubber for a rise in the market. The small river launches receive the news from the steamers of the Amazonian Steam Navigation Co., which ply on the main streams. In this way all information reaches the rubber districts of the upper Amazon.

An average rubber estate extends as a narrow band on both banks of the river and is often fifty to seventy-five miles long. It stretches two to three miles into the forest, but seldom more, as the rubber trees grow only near the river front. Along this narrow stretch of land the camps of the workers are distributed, the headquarters generally being located centrally so that the workers, living at the extremities, can cover the distance from their camp to headquarters in a day and a night. They travel, of course, by boat on the river.

It is the custom on some of the largest and best regulated rubber estates for the workers to assemble every Saturday night at the office, at headquarters, to report the amount of rubber collected and smoked during the week. The amount varies greatly. Many different factors influence the weekly output, such as the poor health of the worker or, as is often the case, his disinclination to work. Weather conditions also play an important rôle in the tapping of the milk. Few workers report a full week of labor. An average working week taken from the reports of eighty-seven men proved to be four days. One or two days with fever or some other disease, or two days with continuous rain and the average of four days is reached. In one camp I observed that the worker, who was a powerful Indian, had made some marks on a piece of board with a burnt stick. He informed me that every time he put in a day's work he made a mark. There were in all forty-eight marks. This was July 5, and he began work on January 1.

A launch comes up to this remote part of Brazil once a month with merchandise and returns down the river with rubber. Shortly before the arrival of the launch the manager makes a canoe journey from one end to the other of his estate and weighs the rubber pellets that are awaiting shipment in the camp of each worker. Then all the rubber is carried to headquarters and placed on the river bank ready for shipment.

The manager pays his workers 6,000 reis for each kilogram; in other words a dollar for each pound of smoked rubber, and sixty

cents for each pound of caoutchouc. The monthly amount collected from each rubber worker is then checked up in an account-book payable to the worker whenever he wants to leave the employ of the manager. However, another little item has to be straightened out before he can leave and that is the account of the merchandise he has purchased. It may be taken for granted that the proprietor is not losing anything. He always has a store in connection with his headquarters. The employees are bound to buy from him, as there is no other store within a radius of a great many miles. Their daily supply of farinha, sugar, coffee, rice and beans, as well as their tools, rifles and ammunition, not to forget medicine and articles of clothing and luxury, all have to be purchased at this store and at prices that are absolutely staggering, though perhaps not so excessive if the locality is taken into consideration. I give here prices as now quoted in the store of Col. R. da Silva, whose estate is on the river Itecoahy, in the Javary region:

One box of sardines	$1.20
One pound of unrefined sugar	.30
One roll of tobacco (retails in Para for $4)	21.30
One basket of farinha (retails in Para for $4.50)	13.30
One bottle of ginger-ale	.60
One pound of potatoes	.60
The cheapest cloth with stamped pattern, per yard	.90
One Collins Machete (N. Y. price $1)	$8 to 10.00
One pair of men's shoes (N. Y. price $2.50)	11.60
One bottle of very plain port wine, 22,000 reis	7.30

Outside of the store is a sign, saying that any employee who owes the house more than 4,000,000 reis ($1200), cannot make purchases exceeding 1,000,000 reis, that is, $300 per month.

The question of debt is by no means an unimportant one to the rubber worker. When he gets employment as a worker on an estate, he is called "Brabo," which means that he is "wild" or unacquainted with the estate and its many estradas. He is, therefore, put in charge of a small estrada, very likely one that nobody else wants, because it gives little or very poor milk. He will probably collect one pound of rubber milk a day and will undoubtedly consume in material and supplies about $4 to $5 a day, so that after three or four months he owes the boss $400 to $500. Very likely, for the rest of the year he will keep abreast of expenses, barely managing, by working from 4 in the morning to 6 at night, in all kinds of weather, to earn as much as he eats and uses. The next year he may have the misfortune to fall sick so that he cannot work for a half year; his debt will then have run up to about $1,000. How-

ever, the manager keeps him as he knows that the "Brabo" will get well some day and work off his debt. If he dies, then his debt is put in the "loss" column, after the profit on the purchased merchandise has been subtracted. Some very industrious workers, good rifle-shots and handy with bow and arrow in shooting fish, often manage to save considerable money, a few years giving them an account of $3,000 to $4,000. They will then leave the service and descend the river to Manaos, where they live as "gentlemen of leisure." Nothing less than champagne and the swellest hotel are good enough for them. These men, who have spent all their lives working in the forests doing the hardest and most trying kind of work, will now in three or four weeks spend several years' earnings, barely leaving them enough to buy a steerage ticket back to the woods.

Here are a few figures which will throw some light on the profits and expenses connected with the running of an average rubber estate. I have chosen the estate of Col. R. da Silva as, in size and output, it may be called representative. The annual output is about 100,000 pounds of rubber. Allowing for fluctuations, the sales amount to $200,000 and the wages paid to employees to $60,000. The store connected with this establishment is supplied from wholesale dealers at an annual cost of $33,000, yielding, in reselling to the workmen a net profit of $24.750 gold. The total net profit of the house is $164,750.

The demarcation, by a Government engineer, of the estate is remarkably expensive and has to be paid the first year. In this case it amounted to $78,000. The annual taxes are: government, $18; municipal, $60; state, $150.

THE ECONOMIC IMPORTANCE OF THE PLATEAUS IN TROPIC AMERICA*

BY

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The mathematical limits of the Torrid Zone cause the tropic regions to receive much undue credit, because high altitude extends the Temperate Zone in the form of mountain and plateau islands which

* This suggestive paper, read before the Eighth International Geographical Congress, in 1904, and published in its *Proceedings*, has been revised and expanded by Prof. Smith for the *Bulletin*. It is printed here in the belief that its facts and opinions are of timely interest in view of the rapidly growing attention to tropical America.—THE EDITOR.

rise above the surrounding tropics. These far flung outliers of the north are too often counted in with regions of their latitude which thus get unmerited credit in many economic considerations.

If those parts of the tropic latitudes that do not possess tropic climate or yield tropic products were excluded from our consideration of that Zone our ideas of it would be materially modified. This is especially the case in America.

The plateaus and plains of tropic America offer an interesting paradox in their relation to the foreign commerce of those regions. The highlands are the chief seats of population; the lowlands are the natural, and, indeed, the only place for the production of most of the large and increasingly important list of staples for which the non-tropical regions depend upon the tropical. Here is a vast field for ethnic and industrial readjustment by which the people should relocate themselves where they can have access to the best resources and those fitted to produce the most universally desired products.

A survey of that half of the American continent lying between the Rio Grande and the Rio de la Plata shows a topographic distribution of dominant population groups, population that is the exact opposite of that prevailing in the temperate parts of the Americas, of Europe, and of Asia.

In North America the early colonists established themselves on the Atlantic plain, gradually worked up the valleys of the Atlantic rivers, and thence westward into the basin of the Great Lakes, to the valley of the Mississippi and its northern extension, which is fast becoming the seat of empire upon the continent. Along the Pacific coast similar conditions were repeated. The valleys of California, Oregon, and Washington contain nearly all the population of those States, leaving large areas outside with very scanty population.

In Europe the dense populations are on the good lands of the great low plain extending from the Pyrenees to the Urals, and in the valleys of the Po, the Danube, and the British rivers. In Asia the great majority of the people, possibly nine-tenths of the population of the whole continent—half the people of the world—are crowded into the lowlands of the monsoon countries between the Indus and Manchuria and northern Japan. Upon these lands the summer monsoon rains make possible the growth of heavy summer crops. In overpopulated Japan agriculture is practically limited to a paltry 15 per cent. of the land, a mere fringe around the edge of the mountainous isles, where irrigation water can be secured from the mountain streams which flow across the narrow plains to the sea.

Throughout tropical America the centers of population are, with

few exceptions, upon the interior highlands, and 99 per cent. of the vast area of lowlands skirting the two oceans, and sometimes reaching the interior of the continent, is unsettled, unused land. Instead of being the home of peoples, as in the temperate lands, it has always been a bar to settlement, and is to this day a hindrance or a prohibition to commerce and a vast land reserve of great but unknown possibilities for a more resourceful future to utilize.

In Mexico the geographers usually classify three zones—the cold, the temperate, and the hot, corresponding to the plateau, the slopes, and the low plains. Upon the first two are centered nine-tenths of the people. The plateau has in some sections a population as dense as that of France, and, considering its aridity, is really overpopulated, and the pressure of people upon subsistence is causing an alarming denudation of the rather scanty forest growth. Aside from the small seaports, the lowlands have a sparse population of planters, wild Indians, lumbermen, and other forest workers. A few new plantations have also been started there, and this new work, in conjunction with recent railroad building, has created a demand for labor that can be met only by importing laborers from the plateau; and one of the needed reforms of the Government is to stop the carrying away of the highland dwellers to involuntary servitude in the lowland forests. The profound climatic difference between the temperate Mexican plateau and the tropic lowland is evidenced by the dread that the highlander has of the lowland where he so often perishes like any newcomer from a cool climate.

Central America is still more pronouncedly a plateau country. The heavy rains from the trade winds give dense forests to the slopes and reduce much of the coastal plain to swampy jungle. The Atlantic plain being wider than the Pacific, the plateau between the double mountain ranges to the west was more easily reached from the latter ocean, from which it was settled and through whose ports its commerce was for more than three centuries almost exclusively carried on. In recent years coastal settlements along the Caribbean have grown through the rise of the banana industry, and Costa Rica and Guatemala have shifted a part of their commerce to the east through the opening of railroads to Caribbean ports; but for the majority of its population Central America is still, economically speaking, a Pacific country, because the centers of population, being upon the plateau, lie nearer to that ocean and use it as their highway to the outside world.

The Pacific coast of South America shows in the main the same plateau predominance. The marine plain from Panama to central

Ecuador is wet, forest clad, and, except in some unwholesome ports, is populated only by a few wandering Indians. Ecuador consists of a fertile low plain, containing one-fourth of the population, and a high, isolated, and hilly plateau between the ranges of the Andes, upon which the remaining three-fourths of the people are crowded, and an interior tropic low plain teeming with beast, birds, insects and fish, an overgrown jungle of vegetation so hopeless of passage that it is trackless. The great majority of Ecudoreans, the plateau dwellers live by growing corn, beans and wheat, and keeping cattle —temperate zone agriculture. Peru presents a similar arrangement of humanity, with a comparatively dense population upon a plateau so high that at times men wear woolen masks to protect their faces from the cutting winds. The Peruvian coast lands have a greater development than any other in tropical America, owing to the aridity and healthfulness of the desert and a water supply from the Andes to support agriculture by irrigation.

In northern South America the outlying ramifications of the Andes mark the limits of the really peopled districts. Colombia, drained by the splendid Magdalena, uses that river as a means of communication to cross the malarial desert that lies between the sea-coasts and the isolated plateau settlements. The great moist valley of this river lies almost untenanted. Venezuela has a similar condition, but fortunately her plateaus, centering around Caracas, are nearer the sea. The Orinoco drainage basin with tens and hundreds of thousands of square miles of grass and forest lands, has a few feeble settlements supplied by one trading steamer. This valley typifies the conditions of the interior of the South American continent. One of the world's greatest plains extends from the mouth of the Orinoco to the mouth of the Rio de la Plata and from the mouth of the Amazon to the foot of the Andes, a region that is double the area of the Mississippi Valley with its 40,000,000 people, or the Yangtse Kiang, with 150,000,000; but the South American land with its eight sovereign nations, is a land unknown. In northern Argentina, even outside the tropic, large rivers have never been correctly charted, and in the Amazon Valley American commonwealths could be lost to the world if put down in the midst of unexplored reaches of jungle that extend to the base of the Andes. Only the larger streams have been navigated by native and Portuguese rubber gatherers and a few scientific expeditions.

In Brazil the center of population is on the plateau lying inland from Rio de Janeiro and Santos and on both sides of the Tropic of Capricorn. In this area is the center of the world's coffee produc-

tion and the best-developed railway net to be found in the Torrid Zone. The elevation of the district, in connection with its large latitude, however, rob it of full tropical climate.

The coast of Brazil has the largest seaports of tropical America—Rio de Janeiro, Bahia, and Pernambuco. These cities are all on a coast swept by the trade winds, and, excepting Rio, which is the national capital and the port for a large interior district, each is the center of a producing district of small area lying close to the sea and inhabited chiefly by a colored population. In British Guiana this coastal characteristic is more pointedly brought to attention, because nearly all the exports of this large colony are grown on a strip of alluvium diked and reclaimed from the sea after the manner of Holland. Furthermore, the coast settlements and cities from Rio de Janeiro to Guiana are largely populated by negroes or mulattoes, or, as in Guiana, by imported East Indian coolies.

The location of cities in tropical America shows forcibly the importance of the plateau. In temperate North America and in northern Europe there is no national capital that is not located on a low plain, many of them are seaports, and all can be reached from the sea by at least river or canal navigation. In all tropical America there are 11 independent nations, excepting Panama, and of the 11 but 1, Brazil, has a capital city that is also a seaport. Even the Brazilian capital is not fully maritime, since the suburb of Petropolis, on the escarpment of the plateau, is the real administrative center, the residence of the diplomatic corps and the Brazilian aristocracy, and has also a growing textile industry.

The other 10 capitals of the American Tropics are beyond the reach of any kind of navigable connection with the ocean, and are usually situated upon plateaus from 2,000 to 9,000 feet in elevation, where good drainage and cool and wholesome climate prevail.

The colonies of Guiana and Belize do not enter into this comparison, because they possess no available plateaus for capital sites. They are instead composed chiefly of endless jungle over which sickly settlements on a tradewind coast exercise a nominal jurisdiction.

This centering of city as well as country life upon the plateau leads to a peculiarity of cities which may really be called a division of city functions. In the Temperate Zone every seaport develops in time into a considerable industrial center, the productive industries often supporting more of the population than the purely commercial. Such is the case even with New York. In the greater part of tropical America these two services are separated, and the city may be

thought of as in two parts, one, the port, commercial, the other, upon the highland, industrial, administrative, and residential. In Costa Rica the capital, San José, has its port in Port Limon; Caracas has La Guiara and Puerto Cabello, and Lima has Callao. Santos, Brazil, with 20,000 people, is the greatest coffee port in the world and the port for São Paulo, on the heights above, a thriving plateau city with population of over 200,000. Each of these ports is much smaller than the city for which it is the outlet, the ratio ranging from about one-third to one-tenth, or even less, the City of Mexico having about 350,000 people, whereas the population of Vera Cruz does not exceed 30,000.

The economic effect of this predominance of the plateau is that the population is located on the least productive lands, and commerce is handicapped by the great difficulty of reaching the sea. This difficulty at times borders upon prohibition, and it is prohibition for commerce in any modern sense of the word. The upland dwellers of Ecuador, for example, numbering hundreds of thousands, possibly a million, and including the residents of the capital of the country, were, until the beginning of railroad work recently completed, dependent for connection with the outside world entirely upon a mule trail, where life and property were often threatened with destruction by slipping from narrow rocks to abysses below. Another part of this same trail crossed the lowlands, which the rainy season often made impassable even for pack animals. This case is extreme in the number of people dependent upon a single route, but it is fairly typical of the conditions that separate a large proportion of the people of tropical America from the world's highway, the ocean. As a natural result of this isolation many of these people have almost no foreign commerce whatever. The statement is not made that any single country has no foreign trade, for they all have; but each contains a considerable share of people who have almost no part in this trade and who live in houses of local construction, some without an iron nail in them, eat home-grown food entirely, and wear clothing of the meagerest pattern, possibly of homespun, possibly of imported cloth.

This economic isolation is indicated by an examination of the products exported from these regions, for imports must be paid for with exports. By classifying them in two lists, we may see the relative parts taken by the highlands and the lowlands.

EXPORTS FROM TROPICAL AMERICA

Plateau exports.—**Coffee, ores and metals, hides, skins, wool, cinchona bark.**

Lowland exports.—**Rubber, sugar, cocoa, bananas, cotton, tobacco, gold, asphalt, cedar, mahogany, dyewoods, cabinet woods, spices, sarsaparilla, vanilla,**

indigo, cocoanuts, ivory nuts, brazil nuts, cochineal, fibres and bristles, cocaine and drugs, Panama hats, many miscellaneous articles in small quantities.

***Staple tropical products imported by temperate peoples from Eastern Hemisphere.*—Tea, rice, manila hemp, jute, varnish gums, pepper and other spices.**

The plateau list is short, but is important in the volume and value of its articles. The lowland list is much longer, but no single article in it equals in importance the two leaders in the plateau column, coffee and minerals; yet as a group the lowland products are exceedingly important for modern commerce, and of great promise for the future. Only one of the plateau products, coffee, is really tropical, and it is not yet certain that its cultivation must be limited to plateaus. Some very suggestive experiments in coffee culture are being carried on at low elevations in Mexico. The ores and metals are natural mountain products in all climes, and the mountains in the countries under review are rich in minerals. The skins of cattle, goats, sheep, deer, and other wild animals are commodities of high value, good keeping qualities and easy transport, and together with some wool they make up the most universal basis of export from the plateaus, and along with metals pay for the meager imports of those regions which are not so fortunate as to grow coffee. It thus appears that many of the people within the Torrid Zone are trading exclusively in nontropical produce, and that the large majority of the population, those upon the plateau, have probably a small majority of the commerce, including but one tropical product of importance—coffee.

There yet remains a long list of really tropical and lowland products, the ones we think of when the word "tropic" is spoken, rubber, cocoa, sugar, banana, mahogany, dyewoods, and all the roots, fruits, nuts, drugs, extracts, and products of the forest, the palm, and the cultivated field. These much-sought products give a greater per capita foreign trade to that small proportion of the population living in the lowlands. The growth of the lowland population has not yet responded to the growth of the lowland trade. Almost without exception, the natural and cultivated products of the American Tropics are in increasing demand in North America and Europe, where they are required as food or as raw materials of industry. Moreover, several staples of the Eastern Tropics may probably, with proper industrial conditions, be cultivated in America, and rice certainly can be, although it is now imported by every country between Cape Horn and the Arctic Ocean. Suggestive examples of tropic crop introduction when labor conditions are suitable are furnished by the way the East Indies have wrested the cinchona industry from

South America and the successful competition of British India and Ceylon with the *Chinese* and Japanese tea growers following deliberate and systematic introduction of the industry by the British in their Colonies.

The needs of the world commerce require the products that may be produced in the lowlands of tropical America. Can the population of these regions increase in number and industry to meet these demands? Under the present condition it does not promise to do so, but there are at least two ways in which it may become possible—one is by the introduction of Asiatics, accustomed to similar climate. This policy the British have tried in a small way successfully in some of their colonies, but the independent countries of the American continent have not yet made a success of that method.

The other means of peopling these lands is by the application of science to eliminate the tropical diseases that are now so fatal to white men and harmful to others. This is a possibility which is just arising, but which may rediscover to us the New World during the present century. Most of the particularly troublesome and so-called contagious diseases are now explained as due to or transmitted by the activity of animal organisms of various kinds. Once the danger is known it may usually be averted by combating some insect or germ or by inoculating the person so that the germs have no effect. Within the memory of living men smallpox has declined from the position of the world's greatest plague to a second-rate disease, due only to carelessness. The germ of typhoid fever is known and with care the disease can be controlled and prevented. Millions of our contemporaries have followed the steps by which mosquitoes have been proved the guilty agents in the spread of the dread and mysterious yellow fever, and the disease has in places been stamped out completely. In the same way the sleeping sickness of Africa is now known to be due to a variety of the tsetse fly, and malaria, the bane of tropics and lowlands everywhere, is now explained by science as another of the insect-carried diseases. As medical science has just begun systematically to study these questions, it is fair to presume, in the light of present progress, that the time is not far distant when it may be almost or quite as easy to keep free from disease in the Mexican plains, in the Amazon or the Magdalena Valleys, as in the Mississippi Valley.

If such a condition is attained, it but remains to so organize lines of transportation that it will be easy to travel from the hot lands to the nearest section of plateau, and so to organize society and industry that the vacations for men and recreation and recuperation

for women and children may be easily obtained upon some cool plateau, with which the Tropics abound. There the depressing effects of long-continued heat and humidity can be avoided. In this respect it will resemble the life in American cities, from which people migrate by the hundreds of thousands in the heated season.

This will give a chance for the working out of productive organization along lines similar to those which Mr. Benjamin Kidd declares to be inevitable if political organization ever comes to the tropics. It has already succeeded both politically and industrially in Java and parts of Sumatra and the Straits Settlements where the Dutch and English keep order while the millions of Malays increase and produce things we want. There the English and Dutch superintend the plantations and mines while the Malays, the Hindoos and the Chinese perform the labor that produces sugar, tobacco, tin, cinchona, rubber and other products that minister so satisfactorily to the physical needs of temperate zone dwellers.

Europe is now using and will continue to make continued and increasing use of the new knowledge of tropical control in the old world tropics. It now remains for some one to take up the policeman's duty in America, start the Malay, Hindoo and Chinese emigrant ship and organize the trained corps of northern superintendance. Overcrowded Europe has been able to find relief through emigration to North America. India and China are in far greater need of a place for overflow, but have not yet been able to reach it. The means for promoting this emigration are now at hand. Thus, and apparently only thus, can the Tropic American lowland come into any use during this century. If it is thus opened world population and world trade will experience a transformation of a magnitude witnessed but once before in the history of the world—the settlement and development of the Mississippi Valley. Millions of square miles of the most fertile land will be opened to the surplus populations of Asia, Europe and America, and the seat of empire in the American Tropics, as in the Temperate Zone, will shift to its natural place on the shores of the sea and the banks of great rivers. The thorough application of science to tropical agriculture can make these lands most productive. The present production on these lands is no index for the future, because science has not yet been applied extensively to tropic agriculture. World commerce will surge forward because of the production of commodities which can not be grown elsewhere and which are desired by men of all climes.

Without careful organization of production controlled from some cool office and supported on old world labor the scattering indus-

tries of the Tropic American lowland, have an uncertain future. The fate of the Chinese tea market and the South American Cinchona bark industry are suggestive of what the scores of millions of the tropic East can do when competing under European management with the few and feeble settlements of Indians and mulatoes and half-breeds who, under notoriously bad governments, are responsible for the present small produce of the Tropic American lowland. The only industries that can hope to escape the competition of the East are those yielding a perishable product like the banana which must originate near some definite northern market.

It therefore appears to rest upon the decision of Temperate Zone peoples whether or not the next half century witnesses increase or decrease in the relative importance of the tropic American lowland in comparison to the now dominant plateau.

A political objection may arise in some quarters. The independent nations of South America and Central America may wish to try the experiment of keeping their lands to be western, not Oriental. They may be fired by the desire to have them whitemen's lands, not yellow or brown or blackmen's lands. In such case, and it is far from hypothetical, there lie the European colonies in America, for which let us be grateful. British Guiana, with a population of less than three per square mile, of whom seventeen-eighteenths are colored, has no reason to yearn to be a whiteman's land, nor does the coolie-importing government have any such ambitions for it. Its 90,000 square miles, if fully tilled, would come surprisingly near supplying the world with all the tropical produce it now requires. The way, therefore, appears clear for an extensive trial of industrial colonization at any time that market conditions push enterprise into this opening.

NOTES ON THE DESCRIPTION OF LAND FORMS.—III.

MORPHOLOGIE DES BÖHMERWALDES. By Prof. Dr. H. Mayr. (*Landeskundl. Forsch.* Geogr. Gesellsch., München. Heft 8, 1910, 123 p.) This painstaking and largely inductive study of a region, concerning which little modern physiographic information is to be had, may be taken as typical of a way of treating land forms which can be called the method of uncorrelated explanations; for, following the general genetic principle of the action of internal against external forces, announced in the introduction, the author proceeds to develop a number of theoretical and explanatory considerations, but without correlating them in a comprehensive evolutionary scheme. Detailed chapters on geology, climatology and hydrography occupy 77 pages; "Landschaftsformen" are treated in the remaining 44, with such sub-titles as tectonic valleys, erosional valleys, ridges and domes, etc.

The essay is of rather difficult reading, because so many independent and unexplained items are presented before the generalizations that combine and explain them are reached; this being a characteristic of the inductive method, in contrast to a method that begins with a concise explanatory statement, in view of which all items afterwards mentioned may be given their proper place and meaning as soon as they are encountered. The plan of treatment adopted by Mayr is, moreover, strikingly unlike that followed by Demangeon in his essay on the Limousin, reviewed in these notes last November, in which the scheme of the cycle of erosion was so fully adopted and so effectively used; for in Mayr's study the considerations usually associated with that helpful scheme are almost completely excluded. Their exclusion is to my reading a disadvantage, for it makes the descriptions of land forms less clear and the explanations given to them less secure. The lack of clearness and of security, as characteristic of the method of uncorrelated explanations, deserve special scrutiny.

The lack of clearness in Mayr's descriptions is seen in the uncertainty that remains in the reader's mind as to whether the generally subdued and waste-covered forms of the Böhmerwald highlands possess those rounded summits and moderate inequalities of height that characterize the late stage of a single cycle of erosion, in which all traces of forms developed in a former cycle are lost; or whether the highlands exhibit, as is so often the case in regions of greatly deformed and deeply eroded structures, broad-topped remnants of old forms developed in an earlier cycle, separated by young or submature valleys eroded during the current cycle. These alternative interpretations are worth examining, because the conception of the landscape that the reader gains from the observer's description must vary, according as one or the other interpretation is adopted.

The region consists for the greater part of schists and gneisses, striking northwest-southeast, and of massive granites. The chief deformations and intrusions are regarded as not later than Carboniferous, with subordinate and imperfectly specified dislocations of Tertiary date. Hence, as far as time is concerned, there has evidently been an abundance of it, since the period of strong mountain building and during the great degradation that the region has suffered, for the passage of several cycles of erosion, separated by successive uplifts without significant deformation. The question, however, that here stands open for the geographer to resolve is not whether successive cycles of erosion have taken place in the geological past, but whether traces of more than one cycle of erosion are visible in the forms of the geographical present. The readers of Mayr's essay have to try to answer this question by appealing, not to the facts, but to an expert's description of the facts, and it is the uncertainty which remains after this appeal is made which must be regarded as a lack of clearness, and hence as a disadvantage of the method of uncorrelated explanations.

The sufficiency of a single cycle of erosion to explain the existing forms of the Böhmerwald is implied in the statement that there is a gradual transition from the higher ridges and hills along the Bavarian-Bohemian boundary northeastward to the peneplain of middle Bohemia (p. 2); for from this it might be fairly inferred that the greatly degraded forms of the Böhmerwald are the subdued one-cycle residuals of the most resistant rocks in a region which, in its areas of weaker rocks farther northeast, has reached advanced old age. The sufficiency of one cycle is again implied by the statement that the systematic decrease of fall down stream in the graded rivers is to be explained by the advanced age of the mountains (108); for if, on the contrary, the valleys were of two cycle origin, a headwater stream might still retain the faint fall of a former old age, after a middle stretch had gained a steeper fall in a newly deepened valley of revived erosion. The same implication is once more found in the explanation—of doubtful validity, as will be shown below—of the so-called tectonic valleys (81-), which are treated as owing their form chiefly to the deformation by which the mountains were created; for if any forms due to initial deformation still remain, prolonged erosion in several cycles separated by successive uplifts becomes very improbable, if not altogether impossible.

On the other hand, the highlands are described as monotonous (6, 115), with flat-topped ridges (83, 118), often having summits of similar altitude (121), and in one locality expanding in a plateau-like surface of "unexplainable origin" (117). All these features so strongly suggest that a former cycle of erosion witnessed the production of a peneplain, which is now elevated and elaborately dissected in the current cycle of Böhmerwald evolution, that one would be justified in tentatively accepting so plausible a conclusion, were it not that no mention of it is made by the author. Absence of mention can

hardly be ascribed to unfamiliarity with the idea of cycles of erosion on the author's part, for he occasionally uses terms, such as mature (*ausgereift*, 109), that go with the cycle scheme; and he explicitly recognizes the occurrence of the peneplain of middle Bohemia, as above noted; and, as is well known, a peneplain is the penultimate member of the series of forms evolved in an undisturbed cycle of erosion. Hence, absence of mention of two-cycle forms would seem to indicate that the author did not regard the monotonous highland landscape with its flat-topped ridges as indicative of two-cycle explanation. But uncertainty must still remain in the reader's mind even on this point, because the author does not contradict the implication of two cycles, given in his empirical descriptions, by an explicit avowal of belief in the sufficiency of one cycle, and support his avowal with good reasons therefor. It is this uncertainty of meaning—the bane of many geographical descriptions—that the adoption of any thorough-going scheme of correlated explanations does so much to avoid.

Before considering the lack of security in uncorrelated explanations, let it be explicitly recognized that explanatory descriptions of any kind have been condemned by some conservative empirical geographers, because of the possible insecurity of their explanations. In view of this, it behooves every geographer who prefers an explanatory to an empirical method, to lessen its chances of error by every means in his power. One of the best means to this end is found in the correlation of explanations, for it may be fairly urged that if the separate explanations of many different facts can all be reasonably united in a comprehensive explanatory scheme, the probability of their correctness is thereby much increased. On the other hand, any one of a number of uncorrelated explanations may go astray, without disarrangement of the rest, and therefore with small chance that either the author or his readers can surely detect where the error lies. It is precisely this principle that is illustrated by reference to Mayr's treatment of the valleys of the Böhmerwald. Let it, however, be said at the outset of this discussion that the present reviewer has no personal acquaintance with the region concerned, and that the discussion is therefore limited to Mayr's presentation of the facts. Such a discussion may perhaps be called academic; but whatever name it deserves, it touches a question of method that is of fundamental importance in geography to-day, now that the treatment of land forms is passing from the old-fashioned empirical methods, to the newer fashioned, rational, genetic, explanatory methods. No one can read the current geographical journals without becoming aware that this transition is going on, a transition that is bringing about the establishment of the same evolutionary philosophy in geography that is already so strongly established in other sciences. We are indeed rather late in making a change that our geological and biological colleagues have made already; but we are surely making the change, and it is well that we should

make it with full understanding of its difficulties and its advantages. The clearness and security of any method of explanatory description therefore deserve examination.

The question now before us is whether the facts regarding the valleys of the Böhmerwald are more safely presented to the reader by what is here called the method of uncorrelated explanations than by a method of correlated explanation. Following the method of uncorrelated explanations, as it is employed by Mayr, we learn that the valleys of the Böhmerwald are of two kinds, tectonic and erosional. The chief tectonic valleys are explained as owing their origin to the great Carboniferous mountain-making deformation of the region (p. 81), and as therefore being closely related in trend to the structure of the highlands (84), but unrelated in size to the streams that drain them, and little affected by the work of their streams (81). Three examples of this kind occurring in steep monoclinal gneiss and mica schist (82) are characterized by a direct course between pronounced ridges of uniform lateral slope (84). On the other hand, the erosional valleys are regarded as essentially the work of water (80); but the valleys heads have been modified by ice (90-102). The chief erosional valleys are characterized by indifference to the strike of the rocks (107), by their small breadth (107), and by side slopes that steepen downwards to their base (83).

The difficulty in accepting these contrasted but uncorrelated explanations as safe and sufficient, is due to the absence of various considerations that must come to mind if one attempts to re-state the explanations in terms of a more fully correlated scheme of treatment. Under such a scheme, the principles of the life history of rivers and their valleys show that trough-like depressions may be initiated by deformation, but that such initial forms will be changed into true valleys by the processes of ordinary erosion. They show further that, while young valleys may be narrow and steep-sided, old valleys must be broad floored between faint side slopes and low divides; that consequent valleys, as Powell called them, are incised beneath the troughs and slopes of initial deformation, and that subsequent valleys are developed, as Jukes clearly explained, by headward erosion along belts of weak structure quite independent of initial form; again, that in regions of deformed structure and repeated uplift, subsequent valleys (including under this name, valleys eroded in a second cycle by revived subsequent streams, as well as valleys excavated in a first cycle by the headward erosion of such streams) may come to outrank consequent valleys; this important principle deserving the name of Löwl's law, after its first enunciator; that valleys which are eroded by streams whose courses are inherited, as Shaler phrased it, from an overlying simpler structure on an unconformably underlying complicated structure—the epigenetic streams of Richthofen, or superimposed streams of Powell, shortened to superposed by McGee—manifest marked indifference to structural strike; and finally that

the form of a region, as initiated by deformation, will be unrecognizably changed after a lapse of such a measure of time as the Cretaceous or the Tertiary period, because all the valleys will then have widened to the point of consuming the initial elevations.

With these well established characteristics of rivers and valleys in mind, it is evident that tectonic valleys, as defined by Mayr, correspond to little modified troughs of initial deformation in the above terminology, but it is by no means clear that the three examples, described as tectonic valleys in the Böhmerwald, are really troughs of initial deformation little modified by their streams. Surely the occurrence of these valleys in belts of gneiss and schist of Carboniferous deformation throws great doubt on such an origin. Are the valleys not more likely mature subsequent valleys of the *n*th cycle, their breadth being determined by the breadth of the weak structural belts along which they have been worn out, and therefore having little relation to the size of their streams; their direct course being determined by the direct trend of these guiding structural belts; and the uniform slope of their sides being a natural result of normal weathering and creeping on appropriate structures? But these suppositions cannot be tested, because no sufficiently detailed statements are made concerning the rocks of the valley floors and of the enclosing ridges.

As to erosional valleys, it is surely not possible to discriminate them from tectonic valleys on the basis of narrow form and steep sides. Valleys that are eroded on weak rocks will gain a mature breadth and openness, while valleys eroded in hard rocks still retain a youthful narrowness; but in time even the hard-rock valleys will be worn wide open. It may well be that the narrow valleys of the Böhmerwald are not tectonic; but it does not follow at all that the broad valleys are not erosional.

The moral of all this is, that as long as a discussion of tectonic and erosional valleys, or of any other groups of forms, proceeds independently of the generalized treatment of the region in which they occur, the discussion may seem acceptable, even though it is really insufficient. When such a discussion is tested by paraphrasing its results in the systematic terminology of a more comprehensive scheme, its insufficiency, if it be insufficient, will be brought forward. Hence, when a young geographer chooses and adopts one from among the several extant methods available for the description of the landscapes that he studies, there is a matter of some scientific importance at stake, and not merely a matter of tradition, of accidental habit, or of personal preference. The matter has indeed an objective importance, for the method of treatment will react upon and greatly influence the aim and scope of observational work. There is really a large principle here at stake; for the choice of method is really a choice between conservatism and progress. If the choice be in favor of the older fashioned empirical method, in the hope

of avoiding the dangers of explanatory methods, then one must abandon all the progress made in the explanatory interpretation of land forms during the last century, especially during the last half-century, when the leaders among our western geologists gave so high a standing to American geomorphology. If, on the other hand, the choice be in favor of an explanatory method, then all these helpful interpretations may be employed, and new ones may be searched for; but in this case let the explanations of the chosen method be as thoroughgoing and whole-souled as possible; let piece-meal work be avoided in favor of correlated work, in the conviction that the more fully all explanations are harmoniously combined, the greater is their probability of correctness, and the safer are the descriptions that are phrased in explanatory terms.

W. M. Davis.

GEOGRAPHICAL RECORD

THE AMERICAN GEOGRAPHICAL SOCIETY

The December meeting of the Society. A regular meeting of the Society was held at the Engineering Societies' Building, No. 29 West Thirty-ninth St., on Tuesday Evening, Dec. 20, 1910. Vice-President Greenough in the chair.

The following persons recommended by the Council, were elected to Fellowship:

Samuel R. Betts,
W. C. Brown,
J. Hull Browning,
Robert J. Collier,
George B. Dexter,
P. Maxwell Foshay, M.D.
William Burton DeGarmo, M.D.,
Rev. Milo Hudson Gates,
Samuel E. Hoffman,
Carl Otto Lampland,
Enoch P. Lawrence, M.D.,
John MacGregor Littell,
Winfred R. Martin,
Dave H. Morris,
John Neilson,
Miss Blanche Nevin,
Adolph S. Ochs,
Pehr Olsson-Seffer, Ph.D.,
Frederic Courtland Penfield,
John A. Power,
Edwin N. Sanderson,
Louis Agassiz Shaw,
Henry A Sinclair,
Miss Henrietta C. Wemyss.

The Chairman then introduced Mr. C. J. Blanchard, of the U. S. Reclamation Service, who addressed the Society on "The Arid Regions of the United States and the Reclamation Service." A large number of stereopticon views were shown. Mr. Blanchard described a number of the more important enterprises and showed the transformation that is being made in parts of the arid area which have been turned into the finest of farm lands. Some of his striking pictures presented the same areas before and after the change wrought by the introduction of water.

The Society then adjourned.

Award of the Society's Medals. The Charles P. Daly Medal for Geographical Research has been awarded to Dr. Grove K. Gilbert, the distinguished geologist of the U. S. Geological Survey. The inscription on the medal

reads: "Awarded to Grove Karl Gilbert, Explorer—Writer—Teacher, in recognition of his many notable contributions to knowledge in the field of physical geography. MCMX."

The Cullum Geographical Medal, has been awarded to Prof. Dr. Hermann Wagner, Professor of Geography, at the University of Göttingen, the oldest and one of the most distinguished geographers in the universities of Germany. The inscription on the medal reads: "Awarded to Hermann Wagner in Recognition of his Great Services to the Science of Geography as Writer—Teacher—and Cartographer. MCMX."

NORTH AMERICA

THE POPULATION OF THE UNITED STATES. The Census Bureau has issued a statement giving the results of the Thirteenth Census for the separate states. The figures and a comparison with the population of 1900 with percentage of increase, are as follows:

STATES.	*1910.*	*1900.*	% INC.	STATES.	*1910.*	*1900.*	% INC.
Continental U. S	91,972,267	75,994,575	21.0	Nevada	81,875	42,335	93.4
Alabama	2,138,093	1,828,697	16.9	New Hampshire	430,572	411,588	4.6
Arizona	204,354	122,931	66.2	New Jersey	2,537,167	1,883,669	34.7
Arkansas	1,574,449	1,311,564	20.0	New Mexico	327,301	195,310	67.5
California	2,337,549	1,485,053	60.1	New York	9,113,279	7,268,894	25.4
Colorado	799,024	539,700	48.0	North Carolina	2,206,287	1,893,810	16.5
Connecticut	1,114,756	908,420	22.7	North Dakota	577,056	319,146	80.8
Delaware	202,322	184,735	9.5	Ohio	4,767,121	4,157,545	14.7
Dis. of Columbia.	331,069	278,718	18.8	Oklahoma	1,657,155	790,391	109.7
Florida	751,139	528,542	42 1	Oregon	672,765	413,536	62.7
Georgia	2,609,121	2,216,331	17.7	Pennsylvania	7,665,111	6,302,115	21.6
Idaho	325,594	161,772	101.3	Rhode Island	542,610	428.556	26.6
Illinois	5,638,591	4,821,550	16.9	South Carolina	1,515,400	1,340,316	13.1
Indiana	2,700,876	2,516,462	7.3	South Dakota	583,888	401,570	45.4
Iowa	2,224,771	2,231,853	...	Tennessee	2,184.789	2,020,616	8.1
Kansas	1,690,949	1,470,495	15 0	Texas	3,896,544	3,048,710	27.8
Kentucky	2,289,905	2,147,174	6.6	Utah	373,351	270,749	34.9
Louisiana	1,656,388	1,381,625	19.9	Vermont	355,956	343,641	3 6
Maine	742,371	694,466	6.9	Virginia	2,061,612	1,854,184	11.2
Maryland	1,295.346	1,188,044	9.0	Washington	1,141,990	513,103	120.4
Massachusetts	3,366,416	2,805,346	20.0	West Virginia	1,221,119	958,800	27.4
Michigan	2,810,173	2,420,982	16.1	Wisconsin	2,333,860	2,069,042	12.7
Minnesota	2,075,708	1,751,394	18.5	Wyoming	154,145	92,531	57.0
Mississippi	1,797,114	1,551,270	15.8	Alaska	64,356	63,592	1.5
Missouri	3,293,335	3,106,665	6.0	Hawaii	191,909	154,001	24.6
Montana	376,053	243,329	54.5	Porto Rico	1,118,012	953,243	...
Nebraska	1,192,214	1,066,300	11.8	Military and Naval	.....	91,219	...

THE BADLANDS OF THE BLACK HILLS, S. D. The South Dakota School of Mines, at Rapid City, has just issued *Bull.* No. 9 (Dept. of Geology) by Cleophas C. O'Harra, which supplies the need of a concise description of the Badland formations of the Black Hills region. The monograph of 150 pp., with many illustrations of restored fossil remains, is intended primarily for those who have had no training in geologic and paleontologic study, but who desire to gain an intelligent idea as to the meaning of the Badlands. The paper is therefore of a non-technical character for the most part. The scientific literature on this region is large and readers who wish to inquire more fully into the literature will find a list of the more important publications in this work.

HISTORY OF THE GREAT LAKES. A recent article by Leverett (*Twelfth Report* Mich. Acad. of Sci., 1910, pp. 19-42) gives an excellent, brief outline of the history of the Great Lakes based in the main upon the work of others, but also upon his own studies. He points out that the land was at lower altitude

before the great ice age, and then briefly discusses the problem of preglacial drainage. No definite conclusion on this point is reached, but his general belief is stated as follows:

"It will not be surprising, if a proper evaluation of these factors would throw the balance of probabilities in favor of preglacial discharge of much of the Great Lake region to the Gulf of Mexico."

He says there is a great accumulation of drift south of the Great Lakes region, and states that the northern half of the southern peninsula of Michigan has a depth of 700 to 800 feet of drift on its higher parts, and that the entire southern peninsula has an average of about 300 feet of drift. Some of this drift comes from Canada, but an examination of it in Wisconsin, Illinois, Indiana, Ohio, and Michigan has shown that from 75 to 80 per cent. or more, was derived from south of the Canadian boundary, a large part of it coming from within or around the Great Lakes basins. The significance of this fact upon the problem of the effectiveness of glacial erosion in the basins of these lakes is noteworthy. A large part of the article is devoted to a statement of the successive stages of lake development as the ice dam withdrew toward the northeast. As to the origin of the lake basins Leverett says:

"It thus appears that the lake basins as we now find them are glacially modified lowlands, which have been loaded in places by drift, and in places eroded and weighted down by the ice. They are held up by rock and drift barriers to levels several hundred feet above their rock beds, the lowest, Ontario, being nearly 250 feet, and the highest, Superior, 600 feet above sea level, while the beds of all except Erie extend in places below sea level." R. S. T.

Receding Shorelines near Boston. Specific records of physiographic changes in America are rare, because the country has been settled so short a time. One such series is described by G. B. Roorbach (Shoreline Changes in the Winthrop Area, Mass., *Bull.* Geog. Soc. Phil., Vol. VIII, 1910, pp. 172-190). It is shown that Winthrop Head, a hundred foot sea-cliff on a drumlin, receded 36 feet from 1860 to 1908 or at the rate of 9 inches a year. Grover's Cliff, 70 feet high, retreated at the same rate as Winthrop Head from 1891-1898 and somewhat faster from 1903 to 1905. Beaches are also receding, one end of Point Shirley beach having been pushed back 120 feet since 1860 or two and a half feet a year. Channels have been narrowed by the growth of spits, Shirley Gut having been navigable by ships in 1632 though today it would probably be impossible. It was 1,000 feet wide in 1775 in contrast with 240-460 feet in 1860 and 95-280 feet in 1898, the depth of water decreasing from thirty feet in 1775 to ten feet in 1898. Some drumlins, as Cherry Island and Nix's Mate have been completely cut away by the waves since 1636, although their destruction began long before that time. L. M.

CENTRAL AND SOUTH AMERICA

Biological Survey of the Panama Canal Zone. According to *Science* (Dec. 16, 1910) a Commission, under the direction of the Smithsonian Institution, will investigate and report on the facts relating to the natural history of the Panama Canal Zone. When the Suez Canal was built similar studies were made concerning the natural history of that region. The fauna and flora of the Isthmus of Panama are rich and diversified and as collecting has been done only on a limited scale, a thorough survey is likely to afford new scientific information of much value. By the construction of the Gatun Dam, a vast fresh

water lake will be created that will drive away or drown most of the animals and plants and possibly exterminate some species before they become known to science, unless such a survey be made. Field parties will be sent to the Isthmus, at an early date and the expense will be borne by friends of the Institution.

PROF. BIGELOW GOES TO ARGENTINA. The *Scientific American* announces that Prof. Frank H. Bigelow, who recently resigned from the U. S. Weather Bureau has joined the staff of the Argentine Meteorological Office.

MAJOR FAWCETT RETURNS FROM BOLIVIA. Major P. H. Fawcett, of the British Army, who, in the service of Bolivia assisted in the determination of the disputed boundary between that country and Peru, reached New York on Dec. 6, on his way home. He and his party followed the river Heath for 300 miles, partly on foot and partly in canoes. Heretofore, according to Major Fawcett, the topography of most of the Heath River country has been merely conjectural, the map showing mountains where rivers should be placed and *vice versa*. In the *Bulletin's* report and map on the settlement of this boundary dispute (June, 1910) the Heath River is shown as forming a part of the new boundary, from the region of its sources to its point of junction, with the Rio Madre de Dios.

AFRICA

RAILROADS IN WEST AFRICA. A little over a year ago the Lagos Railroad was opened to Jebba, on the south bank of the Niger River, about 400 miles from its mouth. The success of this line, now connecting the most important port in West Africa with the middle Niger, is thus far phenomenal. The actual receipts for the first nine months of 1910 were $945,000, and the total for the year was expected to exceed $1,250,000, and to leave a surplus over working expenses of about $500,000. The bridging of the Niger at Jebba, will probably not be completed for three years, but meanwhile, the extension of the line as far as Zungeru, about 150 miles, will probably be completed early next year. There is now every probability that through railroad communication will be established, as soon as the Niger bridge is completed, between the coast at Lagos and Kano, only eighty miles south of the French Sudan frontier, a distance of 737 miles by rail. An important branch line is also building to connect Baro on the Niger about 100 miles below Jebba, with the main line and thus with Kano, the chief commercial center in the Western Sudan. Another branch line will connect Bauchi, in Northern Nigeria, with the main line. The importance of this branch, 150 miles long, is that it will join the Port of Lagos and the Bauchi country, which is believed to be one of the largest alluvial tin-bearing districts in the world. The main line will pass through a vast region of great fertility, a large part of which, according to the reports of experts, can produce enormous quantities of cotton, equalling in quality, American Upland. (*United Empire*, Dec., 1910).

EXTENDING THE SUDAN RAILROAD. The railway south from Khartum which reached Wad Medani on the Blue Nile, early in 1910, was opened to traffic as far as Sennar, on Nov. 1. A bridge is now building across the White Nile at Kosti and the railroad will be extended westward from Sennar, across the bridge and thence to El Obeid in Central Kordofan. It is expected that ultimately the railroad will be carried southward from Sennar, circumventing the swamp region of the White Nile and forming a part of the Cape to Cairo railroad.

AUSTRIAN EXPEDITION TO THE SAHARA. *Petermanns Mitteilungen* (2 Halbband, 5 Heft, p. 255) reports that the Austrian African traveller Otto Artbauer started in October with an Austrian artillery officer, Lieut. Kraft, to make his way into the Tibesti region between Fezzan and Wadai. Tibesti is a relatively fertile highland inhabited by the Tibbu, who have an evil reputation for wildness and barbarity and whose country is very little known. Mr. Artbauer has already made several journeys in Mohammedan lands and is master of a number of African dialects as well as an Arabic scholar. The explorers expect to determine astronomical positions, collect meteorological observations, produce a good map and obtain material for the study of these people. After completing their examination of Tibesti they hope to cross Wadai, and then make their way through the Cameroons.

THE LATE LIEUT. BOYD ALEXANDER'S AFRICAN EXPEDITION. The French Expedition which recovered the body of this murdered explorer (*Bulletin*, p. 911, 1910) found his diary which he had written up within a day of his death. It appears from the diary that, after the explorer had ascended Mt. Cameroons, he explored the Manenguba Range and then started northward, through the almost unknown country, by Kentu, into Southern Nigeria, making collections and finally arriving at Ibo on the Benue River. Thence Lieut. Alexander proceeded along through dangerous country, by way of Yola to Maifoni, while his collector José Lopez, went around by Kano to buy camels for the long desert journey across the Continent. At Yola, the explorer had an attack of blackwater fever, but soon recovered and at the beginning of 1910, he started on the last part of his route through Wadai and Darfur to Cairo. As the *Bulletin* has explained, he met his death, in Wadai, (French Sudan) early last year.

ARCHÆOLOGICAL DISCOVERIES IN SOUTH AFRICA. Dr. Carl Peters, the well-known German explorer, claims to have discovered definite trace of the presence of the ancients of classical and pre-classical times in the gold mining districts of South Africa. "I was fortunate enough," says Dr. Peters, "to discover a tablet which, so far as I know, contains the first actual, ancient inscription found in South Africa. Former discoveries were not proved actual inscriptions but were stones bearing marks strongly resembling ancient Semitic writings. The tablet in question was found by one of my men in a slave pit to the south of Inyanga, north of Umtali (Rhodesia). The district contains hundreds of these pits, from twenty to twenty-five feet deep, in which the ancients kept their slaves. The tablet was made of cement, and had been cut in two, evidently while it was soft, the letters on it being in no way damaged. The characters look to me like Greek letters, but other experts say that they are Graeco-Phoenician. I take the tablet to be half of an ancient passport, one portion of which was retained by the master, and the other handed to the messenger. I also discovered, near Zimbabwe, a brass figure of Pan, six and a half inches long, very similar to the figures found at Pompeii, thus proving Greek influence in South Africa apparently at a later period than the tablet I spoke of. These and other discoveries are to my mind further proof that in South Africa there has been a continuation of different ancient civilizations." (*The Amer. Antiquar.*, Vol. 32, No. 3, 1910, pp. 172-3).

DEW AT KIMBERLEY. That clear skies are not essential for the formation of dew is shown in a recent paper entitled "Some Observations of Dew at Kim-

berley," by J. R. Sutton (*Sci. Proc. Roy. Dub. Soc.*, Vol. XII, No. 24, Jan., 1910). It is not in the clear, bright calm nights of the Kimberley winter that the most dew (or frost) is deposited, but rather in the relatively more clouded autumn. Taking all his observations, the author finds that there are 258 observations of dew with clear skies, 85 with a little cloud, and 177 when the cloud state is conspicuous. It is pointed out that it is only when the relative humidity is not high that the fall of temperature on a clear night greatly exceeds the fall under clouds. When the relative humidity is high, there is no greater virtue in a clear sky than in clouds, and dew forms under either, for radiation is pretty nearly as much retarded by the invisible moisture as by the clouds. The advantage of a clear sky is that dew begins to form more quickly. Dew-making, Mr. Sutton concludes, is not a function of the clearness of the sky merely, but rather of the dampness of the air and the length of the night. R. DEC. W.

ASIA

VANDALISM IN CHINA. Mr. Frederick McCormick, Secretary of the Chinese Monuments Society, Peking, writes to our Society with regard to vandalism in China. The depredations of foreign tourists, foreign soldiers, and especially foreign adventurers, after 1900, became such an abuse that the Chinese authorities took notice of it. The China Monuments Society was organized in 1908-09, for the purpose of arresting foreign vandalism in that country.

Vandalism in China, perpetrated by foreigners began to attract attention just after the Boxer war in 1900 and increased very rapidly with the opening of the railways. Foreigners were placed in touch with several important monuments and now the Ming Tombs near Peking, the birthplace of Confucius in Shantung, the ancient capital of Kai Feng Fu, the yet more ancient capital of Honan Fu or Loyang and other places are open to tourists. Mukden and Peking were earlier accessible by rail. Most of the stone figures in the famous Avenue of the Ming Tombs near Peking have been mutilated. The sculptures at the Ming Tomb in Nanking have graven in them the names of American warships and other names, and on this account the Navy Department has issued orders restraining American sailors from acts of vandalism in China. The commanders of the various foreign guards at Peking have also taken measures to prevent abuses by their soldiers. The China Monuments Society has secured the co-operation of the authorities of several governments to restrain their subjects and citizens, and even to punish acts of vandalism. Depredations upon monuments of great antiquity and value have been reported from the Summer Palace near Peking, from Jehol, Mukden, Sian-fu, and Hang Chow.

The notable attempt upon the Nestorian tablet at Sian-fu by a Danish traveller was fully reported by resident missionaries and has been frequently confirmed by the author of the attempt himself. The following statement by one of his auditors in a well known Club in Boston explains the nature of the depredation:

"At a smoke talk on his expedition to Sian-fu he told of this Nestorian Monument, and how, just as he was about to replace it with a newly cut one, it was removed to a place of safety."

In 1908, on account of the confessed intentions of this man to purloin the Nestorian Tablet at Sian-fu, one of the most cherished monuments of China, his intimidation indirectly of the Governor of Shansi, and other abuses and atrocities, the China Monuments Society was at once organized and has since

endeavored to place itself in touch with all right-minded men to secure their co-operation in enforcing its aims.

Severe measures must be taken against this class of travellers and adventurers, many individuals of which write after their names the titles of members of the foremost geographical and other scientific societies. They trade in these often meaningless appellations and in the periods between their exploits on the lecture platform and in the magazines and newspapers, they outrage in China the laws by which they are forcibly governed at home.

The China Monuments Society, especially desires the co-operation of foreign geographical societies, in order to outlaw "a class of charlatans and adventurers from all parts of the world who visit China and commit abuses that owing to exterritorial law cannot be punished in China, afterward reciting in western lands their imaginary adventures misrepresenting the Chinese, and throwing discredit upon western civilization and its representatives in China."

POLAR

CAPT. SCOTT SAILS FOR THE ANTARCTIC. Capt. Robert F. Scott sailed from Port Chalmers, New Zealand, on his South Polar ship, *Terra Nova,* on Nov. 29, for the Antarctic. He hopes to establish winter quarters, near his old station at the foot of Mt. Erebus and also at King Edward VII Land, where, if possible, he will land a small party.

THE ANTARCTIC AGREEMENT. At the meeting of naturalists in Königsberg recently, Lieut. Filchner, gave further information about the second German South Polar Expedition, which he will lead to the Antarctic this year. To avoid collision with the third British South Polar Expedition, commanded by Capt. Scott, which has already started for the Antarctic, and the second Scottish South Polar party, commanded by Bruce, now preparing to go south, the three above named leaders made an agreement to coöperate and each to explore a certain territory. The plan is to send out only one German ship which will reduce the estimated cost of the expedition to about $300,000. The proposed programme is as follows:

Scott will endeavor to penetrate from the Ross Sea to the South Pole and across the Antarctic land mass to Weddell Sea, while Filchner will advance in the opposite direction from Weddell Sea. If they meet, certain members of each party will join the other and they will then continue their explorations independently. It was agreed that the Twentieth meridian shall be the boundary between the German and Scottish fields of work, the Germans working west and the Scottish expedition east of 20° W.L.

When the German Expedition starts next summer it will go first to Buenos Aires and then to South Georgia, which, as a whaling station, has a plant for repairing ships and is thus a fine starting point for an Antarctic Expedition. Thence it will sail to the Sandwich group and on to Weddell Sea, where a base station will be erected. From this station, the Germans will start on their sledge journey through the Antarctic area and hope to decide the question whether it is a continent or a great archipelago. Filchner thinks of taking with him three automobiles of sixty horse power to use for transportation, if the ice conditions are favorable. His crew will consist of 25 sailors and 9 scientific specialists. The ship will be commanded by a Norwegian ice pilot who has made journeys into the North Polar area for twenty-five years. The *Deutschland,* as she has been named, is a whaler, 144 ft. long, 44 ft. wide, with a

capacity of 528 tons, gross. She runs 7 knots an hour, and has a triple hull insuring her against strong ice pressures. Early in December the *Deutschland* will be ready to take on cargo. (*Geogr. Zeitsch.*, Vol. 16, No. 10, p. 590, Leipzig, 1910).

Sir Ernest Shackleton and Wilkes Land. The following is copied from the London *Times* (weekly edition) of Dec. 16:

"We are informed that Lieut. B. E. S. Ninnis, 3rd Royal Fusiliers, is to be appointed for duty with Sir E. Shackleton's Antarctic Expedition. On March 19 last, it was stated in *The Times* that Sir Ernest proposed to go out again to undertake a stretch of exploration which was likely to be fruitful in results so far as our knowledge of the outline of the Antarctic Continent is concerned. Starting from Cape Adare, he proposes to proceed westward along nearly a whole quadrant of the continent to Gaussberg, the headquarters of the German expedition. Along this stretch of coast are to be found a number of names, such as Adelie Land, Clarie Land, Sabrina Land, and so on, given by the expeditions of about 60 years ago, but which remain nothing but names."

This region is Wilkes Land. The Antarctic area offers no more important field for exploration. Explorers who shall ascertain the nature of the region between South Victoria Land and Kaiser Wilhelm II Land, will render a service that must be performed before we can claim a good knowledge of the South Polar area. Nothing has yet been done in America to complete the explorations that Capt. Wilkes began. It would seem that no Antarctic field would be so tempting for American exploratory enterprise as this; and yet the expedition which, it is reported, will be headed by Capt. Bartlett and Mr. Harry Payne Whitney will, it is said, go to Coats Land as its base of operation, though Dr. Bruce, who discovered this land, intends to use it as a base for his coming expedition.

A later report says that Sir Ernest Shackleton hopes on his next expedition to circumnavigate Antarctica.

Temperature Variability in the Antarctic. In the *Quarterly Journal* of the Royal Meteorological Society (Vol. XXXV, No. 152, 1909) Mr. R. C. Mossman discusses the "Interdiurnal Variability of Temperature in Antarctic and Sub-Antarctic Regions." The author considers the day to day differences in the mean temperature of successive days at a few places in the regions for which the necessary daily observations are available. The greatest mean annual temperature variability, viz., 5.9°, was recorded during the drift of the *Belgica* in the ice-pack, this high value being closely followed by a mean of 5.3° at the South Orkneys. In the Victoria Land region Ross Island and Cape Adare have a somewhat lower temperature variability of 4.5°, the values of the southern station being higher in summer and autumn, and lower in winter and spring than at the northern station. South Georgia occupies an intermediate position between a continental and an oceanic climate in its curve of variability, the mean monthly values varying according to the proximity of the pack ice. At this station the seasonal values show a small variation, and this is also the case at Ushuaia, in Tierra del Fuego. The variability at the Falkland Islands and New Year's Island is very small, pointing to the conserving influence exerted by the insular conditions which prevail at these places. The maximum variability occurs in winter, and the minimum in summer, at the three Antarctic stations as well as at South Georgia and the South Orkneys. The smallest variability at any season for any station occurs at the South Orkneys in sum-

mer, being only 1.4° It is at this season that cloud amount and fog frequency are at a maximum while at the same time rapidly moving cyclonic disturbances are of infrequent occurrence. R. DEC. W.

NATURAL HISTORY OF NORTHEAST GREENLAND. Vol. 45, of *Meddelelser om Grönland*, is devoted to "The Terrestrial Mammals and Birds of Northeast Greenland," by A. L. V. Manniche, the ornithologist of the expedition led by the lamented Mylius-Erichsen, in 1906-08. After the death of the leader Mr. Manniche also took charge of the study of the terrestrial mammals of the country. His report is printed in English and covers his study of the eight species of mammals found—the Arctic hare, the Arctic fox, the Arctic wolf, the Polar bear, the ermine, reindeer, the lemming and musk ox. The reindeer seems to have disappeared completely, in the regions visited, but innumerable finds proved the rich occurrence of the species in former times, though not farther north than Holms Land (Lat. 80° 24″ N.) where reindeer horns were found in old Eskimo huts. The number of musk ox seen was comparatively small, though many traces of it and parts of skeletons were found. In Greenland the ermine, as well as the lemming, are confined to the northernmost and northeastern parts of the country. The Greenland ermine, chiefly lives on lemmings, pursuing and killing the animals in their subterranean passages. The polar bear is found at all times of the year on the floe ice and in the inlets, and more rarely on land. A considerable number of hares were shot and eaten during the sledge voyages and about 400 were consumed on the ship, during the two years' sojourn. Thirty-eight species of birds are described in the latter half of the book, which is enriched by many fine illustrations showing animal life with a number of excellent cuts, showing extensive landscapes in this region which the Mylius Erichsen expedition was the first to visit.

OBITUARY

COUNT ADOLPH VON GÖTZEN. Count von Götzen died in Hamburg, in November at the age of 44 years. He became known to geographers through his journey in East Africa, in 1894, when he discovered the Mfumbiro volcanic peaks, in the northwestern part of German East Africa and found that one of these cones was still active. This was the first information brought from Africa, as to the existence of active volcanoes in the central tropical region. He later served as military attaché to the German Embassy at Washington.

GENERAL

THE MILLIONTH MAP. Dr. Bailey Willis recently wrote to the Society: "Argentina, Brazil and Chile have pledged themselves to undertake their share of the preparation of the 1:1,000,000 map, according to the circumstances governing the progress of such work in each particular country. Chile has passed a resolution or statute pledging the country to the work. In the Argentine Chambers a similar resolution was pending when I left in September, and I have no doubt was passed. In Brazil, Dr. Derby has laid out the skeleton of a general map according to the international scheme and he proposes to fill it in by reconnaissance surveys. Chile and Argentina will probably proceed more slowly in the actual preparation of sheets, but such geodetic or topographic work as they are doing is of a good character."

A State-Owned Trans-Atlantic Cable. A plan is under consideration for laying a state-owned cable between Great Britain and Canada. The London *Times* (Dec. 2, 1910) says that the project is to lay the cable along the route surveyed in 1860 by the *Bulldog* and *Fox* from Scotland to the Faroe Islands (225 miles) thence to Iceland (240 miles), thence to Cape Farewell, south end of Greenland (670 miles) thence to Hamilton Inlet, Labrador (510 miles). A cable charge is said to be practicable, which would reduce ordinary messages between Great Britain and Montreal to ten cents a word. The rate on Government press and deferred messages, would in that case be about five cents a word. The cost of carrying out this scheme is estimated at $4,250,000. It may be added that the Government cable through the Pacific, between Canada and Australia is reducing its annual deficit every year, and it is believed that the deficit for the year ending March 31, 1912 will be only about $140,000 to be made good by the coöperating Governments of the United Kingdom, Canada, Australia and New Zealand.

A Gift from Dr. Charcot. Dr. Charcot has presented his exploring ship the *Pourquoi Pas?* to the French department of Public Instruction. The vessel is attached to the Paris National Museum of Natural History and the *Revue scientifique* says that an annual grant of 10,000 francs has been made towards the maintenance of the ship, which will be utilized by the Museum for oceanographical cruises.

Colonial Geography. At the Centennial Celebration of the University of Berlin, Prof. Dr. Hans Meyer presented 150,000 marks to the University, to found an extraordinary professorship of colonial geography in that institution. He also presented to the Geographical Institute of the University 10,000 marks for the establishment of a department of Colonial Geography.

The Study of Vulcanism. At the International Geological Congress in Stockholm, Dr. Emanuel Friedländer, spoke of the establishment of an International Institute of Vulcanology in Naples. The purpose of the proposed institution will be to make it possible for the first time, to carry on without intermission, systematic investigations of volcanic phenomena. For this purpose, laboratories and instruments should be provided. It will be particularly important to carry out regular temperature measurements at various places on Vesuvius, its gases should be regularly observed and analyzed, and the local earth movements that are probably related to volcanic action, should be registered, both during periods of quiesence and during the activity of the volcano. The effort will be made to secure by Jan. 1, 1912, at least 1,500,000 francs, to provide the plant required and further to assure an annual income of at least 50,000 francs. Mr. Friedländer has subscribed 100,000 francs to the building fund and guarantees an annual contribution for ten years of 10,000 francs. All further contributions should be addressed to Emanuel Friedländer, Naples, Vomero, Villa Hertha, via Luigia, San Felice.

President of the Royal Scottish Geographical Society. The Earl of Stair has accepted the Presidency of the Royal Scottish Geographical Society. He succeeds Prof. James Geikie who has held the office of President for the past six years.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

AMERICA

Chez les Français du Canada. Les Émigrants—Québec—Montréal—Ottawa—Le Grand Ouest—Vancouver. Par Jean Lionnet. Troisième édition. 284 pp. Plon-Nourrit et Cie, Imprimeurs-Editeurs, Paris, 1908.

The author, who is President of the Canadian Society, in France, has traveled in Canada and made extended studies of that country. His book, now in its third edition, has proven its usefulness. It is excellent for general reading and especially helpful to those who visit Canada. Although the Canadian French are chiefly settled in Quebec, the whole of Southern Canada, from the Atlantic to the Pacific, is treated in the book.

The Yosemite Valley: Its History, Characteristic Features, and Theories Regarding its Origin. By Galen Clark. 8vo, 108 pp. and 21 illustrations. Nelson L. Slater. Yosemite Valley. 1910.

The complete protection early accorded the Yosemite Valley by Congress, and California, is something to be proud of and grateful for. This beautiful region is one of the choicest treasures of our natural inheritance, and every thoughtful book concerning it is welcome. The little volume here noticed possesses an additional value and interest because its author, Galen Clark, was for many years "Guardian of the Valley" and was also one of the State Commissioners. He was identified with the locality for a half century, and, leaving behind innumerable friends, he recently, at the age of 96, passed "Across the Range." This book was his last. There is a sympathetic introduction from the pen of his old friend, Ben. C. Truman, which briefly relates the career of the genial pioneer, and which is well worth reading. The views are artistically reproduced, and the text is to the point, presenting the traveler with an outline of the history of the valley, some clear descriptions of the great features, and also of the trees, shrubs and flowers. Several pages of hints for visitors should be noted by them before starting for the place. The various theories as to the origin of the valley are briefly related and the author presents one of his own. The frontispiece is a very good portrait of him, which will be valued by all who have known the valley and this noble denizen, whose word "was as good and unimpeachable as a bond." D.

The Riders of the Plains. Adventures and Romance with the North-West Mounted Police, 1873-1910. By A. L. Hayden. xxi, 381 pp., photographs, maps, diagrams, and appendices. A. C. McClurg & Co., Chicago, 1910. $2.75.

Anyone who loves the West of our Continent and would know more of its fascination and romance, will be glad to read this book. Even those who have seen Western Canada only as revealed through the windows of the

Canadian Pacific trains are interested in the Northwest Mounted Police and know the great and gallant work these wearers of the scarlet tunic have done in keeping the peace over an enormous area of the Canadian Plains. The author of this book has lived in personal and intimate contact with the officers and men of this force and has spent much time at their posts in the wilderness. His book is not only an authoritative history of the Mounted Police, but is also a faithful presentment of these guardians of the wilderness in all the phases of their life and duty. The book is full of interest and devoid of sentimentality. Many of the mounted police posts are shown in the fine photographs.

The Panama Canal and Its Makers. By Vaughan Cornish. 192 pp., index, map, and 63 illustrations from photographs taken by the Author. T. Fisher Unwin, London and Leipsic, 1909. 2s. 6d.

The more thoroughly disinterested an author shows himself to be when writing about the Panama Canal, the more interesting his book becomes. Herein lies the permanent interest and value of this account of the canal works. Dr. Cornish took up the study of this subject without prejudices or prepossessions, not only because, as an Englishman, he stood "outside American party politics," but also (and this is by far the more important consideration) because he is a scientific student, not engaged in commerce or in political life. We note particularly the intelligent comments on the vital question of the defense of the canal (Chap. I, historical review, pp. 41, *seq.*); on the facilities afforded by the railway, which so long ago determined de Lesseps's choice of route (p. 30); on the canal as it is to be (Chap. II); on the future of the white race in the tropics (Chap. V), and on the shortening of distances by sea and the steamships now available, or presumably to be available after 1915, for canal transit.

In almost every instance the disposition is manifested to state impartially the conflicting views that are entertained in regard to such subjects as the best type of canal, the comparative healthfulness of the tropics and the temperate zones, etc. We must, however, regard as a blemish the author's failure to direct attention to that geological fact which bears minatorily upon the stability of the isthmus itself and of all works constructed thereon, namely, the dependence of the isthmus upon problematical conditions in the geosynclinal belt that extends along the west coasts of all three American continents. Geologically, Panama is as dependent upon the geosynclinal earthquake belt we have mentioned as, politically, the canal zone is dependent upon the United States. The book seems almost free from positive errors, though, of course, the "Milaflores" frequently mentioned should be Miraflores. The author's first words (introduction): "At the present moment the canal zone of the Isthmus of Panama is the most interesting place in the world," and the concluding words (p. 177): "I confess that after the canal zone most places seem only half alive, and I long to be back where one can watch human activities so great and so intelligent," are certainly pleasant to read and to repeat. We commend to the attention of the reader the clear and impressive statement of the advantages that may be enjoyed by the Atlantic and Gulf ports of the United States, as compared with English and other European ports, and the warning reference (pp. 166 *seq.*) to the absence of an American merchant marine trading with foreign ports. A better brief statement of what may be termed the distribution of benefits which should result from the shortening of ocean routes it would be hard to find. M. W.

Brazil and Her People of To-Day. An Account of the Customs, Characteristics, Amusements, History and Advancement of the Brazilians, and the Development and Resources of their Country. By Nevin O. Winter. x and 388 pp., map, 24 illustrations from original and selected photographs, appendices and index. L. C. Page & Company, Boston, 1910. $3.

The most interesting chapter in this book contains an account of a visit paid by the author to an American colony—the Villa Americana in Brazil.

"At the close of the Civil War," he writes, "many Southern families, whose plantations had been devastated by the Northern armies, felt that they could not live again under the old flag. Proud spirited and unconquered, these brave Southern veterans, who had marched with Stonewall Jackson and the Lees and Johnsons, decided that they would leave the land that had given them birth and seek fortunes anew in a new land amidst new surroundings. Brazil appealed to the leaders of this movement because the plantation system was similar to that under which they had been raised, and slavery was legal in that land, which was still an empire. A few of them went as an advance guard and selected a site about 100 miles northwest of the city of São Paulo. A favorable report was made to those still back in the States, and it was not long before several hundred families had left their Southern homes and were making new homes underneath the Southern Cross. In all it is estimated that at least 500 American families located in that section of the State of São Paulo, Brazil, between the years 1865 and 1870. They came from Texas, Georgia, Alabama, Tennessee, and perhaps one or two other seceding States. . . . Many of the original members of the colony became dissatisfied and returned to their former homes. There are, however, 400 or 500 Americans still living in this colony, or within a radius of a few miles. A few have moved to other parts of Brazil and others have intermarried with Brazilians; but, in general, they have remained true to their Americanism. Some of the original families purchased slaves and worked their plantations in that way, until that institution was abolished in 1888. A few have prospered greatly, but many others have done just fairly well. . . . A Protestant church, called the Union Church, adorns one hill, and a school house, a conspicuous building, is in another part of the village. . . . The members of this colony are now Brazilian subjects, the younger ones because of their birth in that land and the older ones by virtue of a general proclamation. Few of them actually take any part in the politics of the land. All of them, of course, speak the Portuguese language, but use the English in their homes. They are still Americans at heart."

The author touches, rather lightly, almost every subject that has long been familiar to readers of the merely popular descriptions of travel in Brazil. The simple truth is, that some of the natural features in the territory of the greatest South American republic are intrinsically so splendid that each new effort, no matter how inadequate, to describe them is sure to have some element of value. Mr. Winter desires to convey an impression of the falls of Iguassú and Guayrá. Beginning with Iguassú, he says:

"A dozen miles away the smoking columns of mist which crown the falls are plainly visible, and its thunderous roar may sometimes be heard for twenty miles. . . . The first view of these magnificent falls in their solitary grandeur is inspiring. They have the same general shape as Niagara, and are fifty feet higher. The entire falls are more than two miles in width, with a number of islands dividing the cataract. . . . Below the falls are depths

which a hundred fathom line has failed to sound, and the natives call them bottomless. There is a triple leap of 320 feet, the last one alone being a drop of 213 feet over sheer precipices of dark rock. . . . Above these falls, on the Paraná, are the wonderful Guayrá Falls, 125 miles above the junction with the Iguassu . . . . Below the Guayrá cataract the current piles up in the center with a corkscrew action and then dives down again into midstream. It returns to the surface in eddies which leap up twelve or fifteen feet in the air, making, as one scientific investigator terms it, 'rapids with which the whirlpool rapids of Niagara are a quiet duckpond in comparison.' One is lost in considering this frantic water-power here awaiting the harnessing by man." M. W.

AFRICA

Les Blancs D'Afrique. Par le Dr. H. Weisberger. Avec figures, cartes et photographies de types. xxxv and 405 pp. Octave Doin et Fils, Éditeurs. Paris, 1910. F. 5.

The author treats especially of the two principal peoples of North Africa, the Berbers, descendants of the Libyans, and the Egyptians. The studies in the past few years throughout the Sahara have brought to light many facts which Dr. Weisberger uses for the enrichment of this comprehensive discussion of the different peoples of North Africa, who are allied in blood to the white Aryan family.

Von Kongo zum Ubangi. Meine zweite Reise in Mittelafrika. Von Franz Thonner. xi and 116 seiten, 20 Textbildern, 114 Lichtdrucktafeln und 3 Karten. Verlag von Dietrich Reimer (Ernst Vohsen), Berlin, 1910. M. 12.

Mr. Thonner, Congo explorer and botanist, made his first journey to the Congo about fourteen years ago, and his work, "Im Afrikanischen Urwald," gave him reputation. In the present book, he sketches first the changes that he found in the Congo and then describes the new region, which he traversed on foot, between the Congo and the Ubangi, its largest tributary. He concluded his wanderings with a boat journey down the Ubangi. The description of his journey is followed by chapters on the characteristic flora and the various tribes he met in this vast area. He adds a systematic account of the still little-known languages of the region, and his text concludes with meteorological, botanical and linguistic tables.

Not over a fourth of the book, however, is occupied by the text; for this is followed by 114 full-page photographs, one of the best collection of pictures that have yet come from the Belgian Congo. They give many types of landscape, vegetation, the natives, and their various arts. The work will have a high place among books on the Congo.

Marine Investigations in South Africa, Vol. V. 198 pp. and 20 plates. South African Philosophical Society, Cape Town, 1908.

Describes the *Opisthobranchiata,* a new species of *Planocera,* new forms of the *Hemichordata,* a parasitic *Copepod,* and the genus *Botellina.* The plates, black and in other colors, illustrate these forms of life.

ASIA

Aux Ortos. Pays et mission. Par P. Albert Botty. 58 pp. and illustrations. Séminaire des Missions de Scheut-lez-Bruxelles, 1910. Fr. 1.

A description of a part of southwestern Mongolia and of its inhabitants. The little book is of value as giving much detailed and careful information

obtained by a missionary who has long resided there. The pictures help the text.

The Garos. By Major A. Playfair, I.A. With an introduction by Sir J. Bampfylde Fuller, (Published under the orders of the Government of Eastern Bengal and Assam.) xvi and 172 pp., 17 illustrations, 2 maps, and appendices. David Nutt, London, 1909.

Major Playfair describes the general characteristics, customs and language of the Garo tribe. They inhabit the end of the mountain promontory that runs out into the rice lands of Bengal; and they were the first mountaineers with whom the British rulers of Bengal came into contact. They are of Tibeto-Burman stock and their language still retains some similarity to Tibetan. Major Playfair is Deputy Commissioner of Eastern Bengal and Assam. The good book he has written is the result of his unusual opportunities for procuring accurate information, and of his scientific instinct and training, that make his writings careful and trustworthy. The book is a minute study of the people, with much attention to the folklore and a description of their language based upon the grammar by the Rev. E. G. Phillips, of the American Baptist Mission.

Sketches from the Karen Hills. By Alonzo Bunker, D.D. xvi and 199 pp., 17 illustrations. Fleming H. Revell Co., New York and Chicago, 1910. $1.

Dr. Bunker, now in well-earned retirement, was for forty years a representative in Burma of the American Baptist Missionary Union. This new volume from the pen of the pioneer missionary will be welcomed, for Dr. Bunker is a good writer with a story to tell. It has been his lot to make long and perilous journeys to grossly ignorant tribes, whom he helped to change into peaceable, intelligent and law-abiding men and women. These sketches of what he saw and learned are simply written, and the book is both instructive and interesting.

The Mantle of the East. By Edmund Candler. 297 pp. and 17 illustrations. William Blackwood & Sons, Edinburgh and London, 1910. 6s.

The author has travelled in the Orient for over ten years. He has had an opportunity to acquire more than superficial knowledge of much that he has seen. These travel sketches contain a good deal that is above the level of such narratives, but the book was written chiefly for entertainment. This purpose has been successfully carried out.

Sur les Grandes Routes de l'Asie Mineure. Les Parcours ferrés de la Péninsule; Lignes des Chemins de Fer "Ottoman d'Anatole et de Bagdad," Lignes "d'Aidin" et de "Cassaba." Par Jean de Nettancourt-Vaubecourt. iv, 49 pp., xl plates and maps. Ernest Leroux, Paris, 1908. F. 12.

A good geographical description of the important travel routes and railroad lines of Asia Minor, with a large series of photo-engravings of scenes along these routes, accompanied by brief descriptive text.

Geographische Charakterbilder aus der asiatischen Türkei und dem südlichen mesopotamisch-iranischen Randgebirge (Puscht-i küh). Eine Darstellung der Oberflächengestalt, Bevölkerung, Siedlung und Wirtschaft. 176 Originalaufnahmen und drei Karten. Von Hugo Grothe, Dr., jur. et phil. Karl W. Hiersemann, Leipzig, 1909.

Admirable photo-engravings, illustrating Dr. Grothe's journeys. Most of

the material is entirely new and the pictures in connection with the accompanying maps, give a clear idea of the regions he visited.

Carbon und Carbonfossilien des nordlichen und zentralen Tian-Schan. Aus den wissenschaftlichen Ergebnissen der Merzbacherschen Tian-Schan Expedition. Von Paul Grober. Mit drei Tafeln. Verlag der K. B. Akademie der Wissenschaften, München, 1909.

Forms part of the scientific results of Dr. Merzbacher's Expedition of 1902-03.

CURRENT GEOGRAPHICAL PAPERS

NORTH AMERICA

COOKE, WELLS W. Distribution and Migration of North American Shorebirds. *Bull.* 35, Biol. Surv. U. S. Dep. of Agric., 100 pp. and Ills., Washington, 1910.

NICKLES, JOHN M. Bibliography of North American Geology for 1909 with Subject Index. *Bull.* 444, U. S. Geol. Surv., 174 pp., Washington, 1910.

United States

HARPER, ROLAND M. Summer Notes on the Mountain Vegetation of Haywood County, North Carolina. Reprinted from *Torreya*, Vol. 10, No. 3, pp. 53-64, 1910.

HARPER, ROLAND M. A Quantitative Study of the more Conspicuous Vegetation of Certain Natural Subdivisions of the Coastal Plain, as Observed in Traveling from Georgia to New York in July. Map. Reprinted from *Bull.* Torrey Botanical Club, 37; pp. 405-428, 1910.

HARRIS, G. D. Oil and Gas in Louisiana with a Brief Summary of their Occurrence in Adjacent States. *Bull.* 429, U. S. Geol. Surv., 192 pp., Maps, Ills., and Index, Washington, 1910.

MARSHALL, R. B. Results of Spirit Levelling in Delaware, District of Columbia, Maryland, and Virginia. 1896 to 1909, inclusive. *Bull.* 434, 74 pp. and Index, Washington, 1910.

MARSHALL, R. B. Results of Spirit Levelling in Maine, New Hampshire, and Vermont 1896 to 1909, inclusive. *Bull.* 437, U. S. Geol. Surv., 59 pp., and Index, Washington, 1910.

NEWLAND, D. H. AND HENRY LEIGHTON. Gypsum Deposits of New York. *Museum Bull.* 143, N. Y. State Museum, 94 pp., Maps, Ills., and Index, Albany, 1910.

RICH, JOHN LYON. The Physiography of the Bishop Conglomerate, Southwestern Wyoming. Sketch Map and Ills. *Journ. of Geol.*, Vol. 18, No. 7, pp. 601-32, 1910.

SPENCER, J. W. L'évolution des chutes du Niagara. Map. *Le Mouve. Géog.*, Vol. 27, No. 36, Cols. 439-444 and No. 37, Cols. 451-455, 1910.

—— Decisions of the U. S. Geographic Board, Oct. 5, 1910.

—— Decisions, U. S. Geographic Board, Nov. 2, 1910.

Canada

ADAMS, FRANK D. and ALFRED E. BARLOW. Geology of the Haliburton and Bancroft Areas, Province of Ontario. *Mem.* No. 6, Dept. of Mines, Geol. Survey Branch, No. 1082, 419 pp., Map and Ills, Ottawa, 1910.

COLEMAN, PROF. A. P. The History of the "Canadian Shield". *Nature*, Vol. 84, No. 2133, pp. 333-339, 1910.

SOUTHWORTH, THOMAS. The Settlement of Northern Ontario. *Trans.* Canadian Institute, Vol. 8, Part 4, No. 19, pp. 461-67, Toronto, 1910.

—— Decisions, July-October, 1910. Geographic Board of Canada. 6 pp., Ottawa, 1910.

Mexico

LUDEWIG, H. JUAN. Die Kautschukkultur in Mexico. *Der Tropenpfl.*, Vol. 14, No. 10, pp. 510-521, 1910.

VILLARELLO, JUAN D. Hidrología subterránea de la Comarca Lagunera del Tlahuaililo, Durango. *Parergones* del Inst. Geol. de Mexico, Tomo 3, No. 4, pp. 205-251, Map and Ills., Mexico, 1910.

CENTRAL AND SOUTH AMERICA

Argentina

SCHMIED, ADALBERT ET ARNOLD. Carte de la région des marais du Rio Pilcomayo et du Rio Confuso. Présentation par Arthur de Claparède. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Intern. de Géog., Vol. 2, pp. 58-61, Geneva, 1910.

SIMON, WALTER. Der Gran-Chako und die Pampas. Map and Ills. *Deutsche Runds. für Geog. u. Stat.*, Vol. 32, No. 12, pp. 529-540, 1910.

—— A Ricordo della Commemorazione Centenaria della Indipendenza della Republica Argentina. *Italiae Argentina*, Instit. Col. Ital., 32 pp., Bergamo, 1910.

Brazil

—— Annuario publicado pelo Observatorio do Rio de Janeiro para os Annos de 1909-1910. [Meteorological Observations, Conversion Tables, etc.]. 405 pp., Rio de Janeiro, 1909.

Cuba

HOLTY-CAMAGÜEY, R. J. Die Zuckerrohrkultur und Zuckerindustrie auf Cuba. Ills. *Tropenpfl.*, Vol. 14, No. 10, pp. 495-510, 1910..

Jamaica

DANÈS, DR. J. V. Geomorphologische Studien im Karstgebiete Jamaikas. Ill. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog. Vol. 2, pp. 178-182, Geneva, 1910.

Peru

JIMENEZ, CARLOS P. Estadística Minera en 1908. *Bol.* del Cuerpo de Ingenieros de Minas del Perú, No. 76, 86 pp., Lima, 1910.

WILSON, DR. LUCY L. W. Climate and Man in Peru. Ills. *Bull.* Geog. Soc. of Phila. Vol. 8, No. 3, pp. 1-19 and No. 4, pp. 27-45, 1910.

Paraguay

CHODAT, PROF. DR. R. and DR. E. HASSLER. Aperçu de la géographie botanique du Paraguay. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 505-536, Geneva, 1910.

AFRICA

ENGLER, PROF. DR. Les Divisions phytogéographiques de l'Afrique. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Geog., Vol. 2, pp. 548-562, Geneva, 1910.

Abyssinia and Egypt

BIEBER, FRIEDRICH J. Reise nach Harar und Adis Ababa. Ills. *Deuts. Runds. für Geog. u. Stat.*, Vol. 32, No. 9, pp. 385-99, No. 10, pp. 442-52 and No. 11, pp. 492-500, 1910.

CYPRIEN, R. P. Une nouvelle fondation aux Pays Gallas (Abyssinie). Ills. *Les Miss. Cath.*, Vol. 42, No. 2161, pp. 517-520, 1910.

ILG, ALFRED. Zur Geschichte der äthiopischen Eisenbahnen. *Jahresbericht* der Geog.—Ethn. Gesells. in Zürich, 1909-1910, pp. 113-134, 1910.

LYONS, CAPT. H.-G. The Survey of Egypt. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Inter. de Géog., Vol. 2, pp. 5-13, Geneva, 1910.

ROSSINI, CARLO CONTI. I principali studi pubblicati in occasione della missione Duchesne-Fournet in Abissinia. *Boll.* Soc. Geog. Ital., Series 4, Vol. 11, No. 9, pp. 1060-71, 1910.

Belgian Congo

DICKERSON, MARY C. In the Heart of Africa. [Congo Exp. of the Amer. Mus.]. Map and Ills. *Journ.* Amer. Mus. of Nat. Hist., Vol. 10, No. 6, pp. 147-170, 1910.

HUTEREAU, A. Documents ethnographiques congolais; Les Manyanga, Les Mafoto, Sketch Maps. *Bull.* Soc. R. Belge de Géog., No. 1, pp. 15-39, No. 2, pp. 138-152, No. 3, pp. 173-197, 1910.

TIBBAUT, ÉM. Nos Missionnaires au Congo. *Bull.* Soc. Belge d'Études Col., Vol. 17, No. 6, pp. 453-482, 1910.

ZIMMERMANN, EMIL. Das heutige Katanga. Ills. *Deut. Kol.*, Vol. 27, No. 40, pp. 659-661, 1910.

—— Le Commerce dans le Bassin du Kasai. *Mouve.* Géog., Vol. 27, No. 35, Cols. 427-430, 1910.

—— Le Katanga. Ills. *Bull.* Soc. Belge d'Études Col., Vol. 17, Nos. 4, pp. 323-38 and No. 6, pp. 423-452, 1910.

British Colonies

MERCHIER, A. Les Colonies anglaises d'Afrique. Maps. *Bull.* Soc. de Géog. de Lille, Vol. 54, No. 10, pp. 193-226, 1910.

British South Africa

COLQUHOUN, A. R. Rhodesia. *United Empire,* Vol. 1 (New Ser.), No. 10, pp. 702-6, 1910.

—— Rhodesia Notes. *United Empire,* Vol. 1, (New Ser.), No. 10, pp. 731-33, 1910.

Cameroons

HESSE, DR. HERMANN. Die finanzielle Entwicklung Kameruns. *Deut. Kol.*, Vol. 27, No. 45, pp. 749-50, 1910.

Central Africa

CZEKANOWSKI, JAN. Beiträge zur Anthropologie von Zentral-Afrika. Map, Ills. *Bull.* Intern. de l'Acad. des Sci. de Cracovie, No. 1, 5B., pp. 414-432, Cracow, 1910.

PISCICELLI, CAPT. MAURIZIO. Sul Lago Bangueolo. Ills. *Boll.* Soc. Geog. Ital., Series 4, Vol. 11, No. 10, pp. 1163-81, 1910.

Central Sudan

CUFINO, LUIGI. L'occupazione dell' Uadai. *Estratto dal. Rass Ital.*, Anno XVIII-N. IV, 17 pp., Naples, 1910.

French West Africa

ESCALE, BOULLAND DE L'. L'Afrique Occidentale Française et la Nigeria Anglaise. *Bull.* Soc. de Géog. de Havre, Vol. 27, Trim. 1, pp. 16-29, Trim. 2, pp. 47-72, 1910.

PONTY, GOV.-GEN. La situation générale de l'Afrique Occidentale Française. *L'Afrique Franç.*, Vol. 19, No. 7, pp. 213-218, 1910.

—— Achèvement du chemin de fer de la Guinée française. L'Ocean relié au Niger. Map. *A Travers le Monde,* No. 40, pp. 317-18, 1910.

—— Commercial Development of French West Africa. *Bd. of Trade J.*, Vol. 70, No. 722, pp. 635-36, 1910.

German Colonies

—— Der Handel der afrikanischen Kolonien und Samoas im Jahre 1909. *Deut. Kol.*, Vol. 27, No. 39, pp. 643-645, 1910.

German East Africa

SCHLOBACH, MAJ. A. D. Mit Lindequist durch Ostafrika. Ills. *Deut. Kol.*, Vol. 27, No. 28, pp. 470-472, No. 38, pp. 632-33, No. 39, pp. 646-48, 1910.

ZIMMERMANN, EMIL. Das deutsche Tanganijka-Njassa-Gebiet. *Deut. Kol.*, Vol. 27, No. 45, pp. 750-52, 1910.

—— Die Sisalkultur in Deutsche-Ostafrika. Ills. *Der Tropenfl.*, Vol. 14, No. 10, pp. 532-539, 1910.

German Southwest Africa

HUTTER, D. Im Gebiet der Etoshapfanne (Deutsche-Südwestafrika). Ills. *Globus*, Vol. 98, No. 1, pp. 1-7, No. 2, pp. 24-31, 1910.

KLEINKEMM-KETTWIG, DR. Die Erforschung der Namib. *Deut. Kol.*, Vol. 27, No. 38, pp. 628-30, 1910.

WAGNER, PERCY A. The Origin of the German South-West African Diamonds. Map. *Trans.* Geol. Soc. of S. Africa, Vol. 13, 1909, pp. 56-60, Johannesburg, 1910.

Italian Africa

FERRARI, CAPT. G. Il Basso Giuba italiano e le concessioni agricole nella Goscia. Ills. *Boll.* Soc. Geog. Ital., Series 4, Vol. 11, Nos. 9, pp. 1079-1111, No. 10, pp. 1203-37, No. 11, pp. 1310-28, 1910.

Liberia

FORBES, EDGAR ALLEN. Notes on the only American Colony in the World. Ills. *Nat. Geog. Mag.*, Vol. 21, No. 9, pp. 719-29, 1910.

[Liberia.] —— Conditions in Liberia. Ills. *Nat. Geog. Mag.* Vol. 21, No. 9, pp. 729-741, 1910.

Madagascar

HOCHREUTINER, DR. B. P. G. Remarques sur la géographie botanique de Madagascar. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 537-547, Geneva, 1910.

North Africa

BERNARD, GEN. Montagnes d'Algérie. Mouzaïa, Aurès, Djurdjura. *Bull.* Soc. de Géog. d'Alger et de l'Afrique du Nord, Vol. 15, Trim. 1, pp. 39-61, 1910.

CUFINO, LUIGI. Il Confine Occidentale della Tripolitania e le Oasi del Kauar. *Estratto dalla Rass. Ital.*, Anno XVIII, No. 4, 20 pp., Naples, 1910.

ETIÉVANT, J. Le commerce tripolitain dans le centre africain. Map and Ill. *Bull.* de l'Afrique Franç., Vol. 19, No. 9, pp. 277-281, 1910.

GALLOIS, EUGÉNE. L'olivier et le palmier en Tunisie. Map. *Bull.* Soc. Géogr. Com. de Paris, Vol. 32, No. 7, pp. 465-481, 1910.

JOLY, A. Notes géographiques sur le Sud Tunisien. *Bull.* Soc. de Géog. d'Alger et de l'Afrique du Nord, Vol. 13, Trim. 3, 1908; and Vol. 14, Trim. 2, pp. 223-250 and Trim. 4, pp. 471-508, 1909.

LEFÈVRE, LIEUT. and Interpreter NEHILL. La région de Tafrata et les tribus qui l'habitent. Map. *Renseign, Col.*, Vol. 19, No. 6, pp. 153-159, and No. 7, pp. 222-230, 1910.

MÉLIA, G. Tabacs en Algérie. *Bull.* Soc. de Géog. d'Alger et de l'Afrique du Nord, Vol. 15, Trim. 1, pp. 62-75, 1910.

Sahara

CUFINO, LUIGI. Le depressioni ad Oriente del Ciad. L'Egueï ed il Toro. *Boll.* Soc. Geog. Ital., Series 4, Vol. 11, No. 9, pp. 1072-78, 1910.

DETCHEBARNE, LIEUT. Une jonction du territoire de Zinder. Maps. *Bull.* de l'Afrique Franç., Vol. 19, No. 9, pp. 283-287, 1910.

GOURAUD, COL. La pacification de la Mauritanie. Map. *La Géog.*, Vol. 22, No. 1, pp. 1-14, 1910.

Sierra Leone

—— Palm Kernel and Oil Industry of——. *Bd. of Trade Journ.*, Vol. 70, No. 722, pp. 634-35, 1910.

—— Sierra Leone. [Information from Trade Report for 1909]. *Bd. of Trade Journ.*, Vol. 70, No. 722, pp. 631-32, 1910.

Southern Nigeria

—— Blue Book Colony of S. Nigeria, 1909. Gov. Pub., Lagoe, 1910.

West Africa

COOPER, J. ASTLEY. Recent Developments in West Africa. *United Empire*, Vol. 1, (New Ser.), No. 8, pp. 539-552, London, 1910.

TSCHARNER, ALBERT-B.-B. Travaux de délimitation de la frontière anglo-française au nord et au sud de la Gambie. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Intern. de Géog., Vol. 2, pp. 62-69, Geneva, 1910.

ASIA

RUDOLPH, PROF. DR. E. Die Beziehungen zwischen den tektonischen und seismischen Verhältnissen Ostasiens. Map. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 201-213, Geneva, 1910.

Anatolia

HUNTINGTON, ELLSWORTH, The Fringe of Verdure Around Asia Minor. Ills. *Nat. Geog. Mag.*, Vol. 21, No. 9, pp. 761-775, 1910.

—— Le port de Smyrne. *Bull.* Soc. de Géog. de Lille, Vol. 54, No. 10, pp. 247-250, 1910.

Arabia

LLOYD, CAPT. R. E. The Geology of the Aden Hinterland. Maps. *Records* Geol. Surv., India, Vol. 38, Part 4, pp. 313-320, Calcutta, 1910.

LECLERCQ, JULES. *Poïezdka na Ararat.* (An Excursion to Ararat). 46 pp., St. Petersburg, 1893.

MILES, LIEUT.-COL. S. B. On the Border of the Great Desert: A Journey in Oman. Map and Ills. *Geogr. Journ.*, Vol. 36, No. 2, pp. 159-178 and No. 4, pp. 405-425, 1910.

China

GUÉBRIANT, MGR. DE. Dans les rapides du Yalong (Chine). Sketch map and Ills. *Les Miss. Cath.*, Vol. 42, No. 2159, pp. 499-501, 2160, pp. 510-12, and 2161, p. 523-24, 1910.

KREYENBERG, DR. Ein Beitrag zur Kenntnis der Fische des Jangtze und seiner Zuflüsse. *Abhandl. und Ber.*, Museum für Natur-und Heimatk. u. d. Naturw. Magdeburg, Vol. 2, No. 1, pp. 1-29, 1909.

—— Abstract of Statistics. Returns of Trade and Trade Reports, 1909. Part 1 (A), Imp. Mar. Customs Stat. Series, Nos. 3 and 4, 52 pp. and Diagram, Shanghai, 1910.

Dutch East Indies

—— Le problème de la main-d'œuvre à Sumatra. *Bull.* Soc. Belge d'Études Col. Vol. 17, Nos. 7-8, pp. 557-564, 1910.

Philippine Islands

—— The Mineral Resources of The Philippine Islands. With Statement Production of Commercial Mineral Products in 1909. Bureau of Sci., Dept. of the Inter., 81 pp., Maps and Ills., Manila, 1910.

Siberia

SIBIRIAKOFF, ALEX. Über die Fahrten der Novgoroder durchs karische Meer und über den Weg durch die Halbinsel Jalmal zum Ob. *Deut. Geog. Blät.*, Vol. 33, No. 3, pp. 193-196, 1910.

Tibet

—— Dalai-Lama oder Taschi-Lama? *Geog. Anzeig.*, Vol. 11, No. 8, pp. 181-2, 1910.

AUSTRALASIA AND OCEANIA

MARSHALL, P. The Glaciation of New Zealand. *Trans.* New Zealand Instit., 1909, Vol. 42, (New Issue), pp. 334-348, Wellington, 1910.

PARK, PROF. JAMES. The Great Ice Age of New Zealand. *Trans.* New Zealand Instit., 1909, Vol. 42, New Issue, pp. 589-612, Wellington, 1910.

SPEIGHT, R. Petrological Notes on Rocks from the Kermadec Islands; with some Geological Evidence for the Existence of a Subtropical Pacific Continent. *Trans.* New Zealand Instit. 1909, Vol. 42, New Issue, pp. 241-54, Wellington, 1910.

EUROPE

BONNEY, REV. PROF. T. G. Some Aspects of the Glacial History of Western Europe. *Scott. Geog. Mag.*, Vol. 26, No. 10, pp. 505-532, 1910.

Austria-Hungary

GÖTZINGER, DR. GUSTAV. Die Bergstürze des Mai 1910 in der Umgebung von Scheibbs. Sketch Map and Ills. *Mitt.* k. k. Geog. Gesells. in Wien, Vol. 53, No. 7-8, pp. 417-425, 1910.

Baltic Sea

—— Die Eisverhältnisse des Winters 1909-10 in den ausserdeutschen Gewässern der Ostsee sowie an der holländischen Küste. Die Eisverhältnisse in den russischen und schwedischen Gewässern. *Annalen* d. Hydrog. u. Mar. Meteor., Vol. 38, No. 9, pp. 467-475, 1910.

France

LALLEMAND, CH. Le nivellement général de la France, ses progrès de 1899 à 1908. Maps and Ills. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Intern. de Géog., Vol. 2, pp. 32-51, Geneva, 1910.

MARGERIE, EMM. DE.. L'Étude du Profil en Long des Cours d'Eau Français. Map. *Annales de Géog.* Vol. 19, No. 106, pp. 318-342, 1910.

METTRIER, HENRI. Le Col du Pelvoux. Ills. *La Montagne,* Vol. 6, No. 9, pp. 521-552, 1910.

SCHARDT, PROF. H. Dérivations glaciaires de Cours d'Eau dans la Suisse occidentale et le Jura français. Ills. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 307-322, Geneva, 1910.

WOHLRABE, WILLY. Die Wasserkräfte Frankreichs. *Deut. Geog. Blät.,* Vol. 33, No. 3, pp. 155-182, 1910.

—— Statistiques. Année 1909. Chambre de Commerce de Boulogne-sur-Mer. 74 pp., Boulogne, 1910.

Germany

BAREN, J. VAN. Der morphologische Bau des niederländischen Diluviums nördlich vom Rhein. Map and Ills. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 143-148, Geneva, 1910.

FRÜH, PROF. DR. J. Einbruch des Lötschbergtunnels unter dem Gasterntal. Map and Profile. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 325-29, Geneva, 1910.

HABENICHT, H. Spuren der Eiszeiten in Norddeutschland und Versuch ihrer Deutung. 15 pp. and Map, Justus Perthes, Gotha, 1910.

KNÖRZER, ALB. Anormale Temperaturverteilung im unterfränkischen Main- und Saaletal. Maps. *Geog. Anzeig.,* Vol. 11, No. 8, pp. 171-175, 1910.

Italy

PLATANIA, DR. GAETANO. Stromboli. Ills. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 235-245, Geneva, 1910.

Portugal

CHOFFAT, PAUL. Présentation d'une carte hypsométrique du Portugal et d'une notice explicative. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 171-174, Geneva, 1910.

Rumania

MARTONNE, E. DE. Sur la position systématique de la chaine des Karpates. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 134-142, Geneva, 1910.

—— Situation économique de la Roumanie. *Bull.* Soc. de Géog. de Lille, Vol. 54, No. 10, pp. 243-245, 1910.

Russia

SCHOKALSKY GÉNÉRAL J. DE. Recueil des nivellements des chemins de fer de la Russie comme base des travaux hypsométriques. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Intern. de Géog., Vol. 2, pp. 54-57, Geneva, 1910.

SEDERHOLM, DR. J. J. Sur la géomorphologie de la Finlande. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 125-133, Geneva, 1910.

TANFILIEF, PROF. G.-J. Über den Einfluss niedriger Bodentemperatur auf die Vegetation in Russland. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 495-501, Geneva, 1910.

United Kingdom

PEDDIE, H. J. The Development of the Inland Waterways of the United Kingdom. *Scott. Geog. Mag.*, Vol. 26, No. 10, pp. 544-48, 1910.

POLAR

BRENNECKE, DR. W. Tiefsee-Forschungen der "Planet"—Expedition (1906-07) Charts. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 403-409, Geneva, 1910.

ENGELL, M. C. Bemerkungen über die geographische Lage der Niederlassungen in Westgrönland. Maps. *Mitt.* k. k. Geog. Gesells. in Wien. Vol. 53, No. 7-8, pp. 406-416, 1910.

MOSSMAN, R. C. Meteorology in the Weddell Quadrant during 1909. Map and Diagram. *Scott. Geog. Mag.*, Vol. 26, No. 8, pp. 407-417, 1910.

MURRAY, JAMES. The Scientific Work of the British Antarctic Expedition of 1907-9. *Geogr. Journ.*, Vol. 36, No. 2, pp. 203-5, 1910.

PEARY, COM. ROBERT E. Peary Arctic Club Expedition to the North Pole, 1908-9. Ill. *Scott. Geog. Mag.*, Vol. 26, No. 8, pp. 393-407, 1910.

PEARY, COM. ROBERT E. Peary Arctic Club Expedition to the North Pole, 1908-9. Ills. *Geogr. Journ.*, Vol. 36, No. 2, pp. 129-148, 1910.

ANTHROPOLOGY

CROOKE, W. Anthropology. *Nature*, Vol. 84, No. 2135, pp. 414-420, 1910.

SCHMIDT, P. W. Grundlinien einer Vergleichung der Religionen und Mythologien der Austronesischen Völker. *Denkschriften* Kais. Akad. d. Wiss. in Wien, Phil.-Hist. Klasse, Band LIII, 142 pp. and Map, Vienna, 1910.

SCHONKEN, F. T. Die Wurzeln der Kapholländischen Volksüberlieferungen. Intern. Archiv für Ethnogr. 87 pp., Leyden, 1910.

TEILLERS, J. W. Ethnographica in het Museum van het Bataviaasch Genootschap van Kunsten en Wetenschappen te Batavia (Java). [Twelve fine Plates on Ethnographical Subjects with Descriptive Text in Dutch and English]. The Hague, 1910.

ECONOMIC GEOGRAPHY

DESCOMBES, PAUL. La surcharge des pâturages et l'aménagement des montagnes. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 481-489, Geneva, 1910.

HALL, A. D. The Fertility of the Soil. *Science*, Vol. 32 (New Ser.), No. 820, pp. 363-371, 1910.

KIMAKOWICZ-WINNICKI, M. VON. Spinn-und Webewerkzeuge. *Darstellungen über früh-und vorgeschichtliche Kultur-Kunst-und Völkerentwick.* No. 2, 70 pp., Ills., and Index, Würzburg, 1910.

MITCHELL, GUY ELLIOTT. A New Source of Power. [Lignite.] Ills. *Nat. Geog. Mag.*, Vol. 21, No. 11, pp. 935-944, 1910.

EDUCATIONAL

FETZ, A. Idee zur Einrichtung eines "Geographiesaales" in mehrklassigen Schulen. *Geog. Anzeig.*, Vol. 11, No. 8, pp. 176-179, 1910.

HARMS, E. and O. KÄMPFER. Das Geographische Seminar in Göttingen. Ills. *Geog. Anzeiger*, Vol. 11, No. 7, pp. 145-151, 1910.

MATHEMATICAL GEOGRAPHY

BALL DR. L. DE. Theorie der astrographischen Ortsbestimmung. Ills. *Sitzungsb.* der Kais. Akad. der Wiss., Mathem.-Naturwiss. Klasse, Vol. 118, No. 8, pp. 1237-79, Vienna, 1909.

BECKER, PROF. FRID. Die Kunst in der Kartographie. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 108-109, Geneva, 1910.

EGINITIS, D. La latitude et la longitude d'Athenes. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Intern. de Géog., Vol. 2, pp. 23-28, Geneva, 1910.

HUGERSHOFF, DR. Die periodischen Fehler barometrisch bestimmter Höhenunterschiede in der inneren Tropenzone. Diagram. *Mitt.* des Vereins für Erdk. zu Dresden, Vol. 2, No. 1, pp. 1-59, 1910.

NICOLLE, ERNEST. Rapport sur la question du Méridien de Greenwich comme base des fuseaux horaires, spécialement envisagées au point de vue de la France. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Inter, de Géog., Vol. 2, pp. 14-19, Geneva, 1910.

PERRON, CHARLES. De la Réfection en Fac-similé des anciens monuments de la Géographie et de son utilité pour la Création de Musées Cartographiques. *Compte Rendu* des Travaux du Congrès, Neuvième Congrès Intern. de Géog., Vol. 2, pp. 20-22, Geneva, 1910.

SCHOKALSKY GÉNÉRAL J. DE. De l'utilité d'une association cartographique internationale. *Compte Rendu* des Travaux du Congrès, Neuvième Congrés Intern. de Géog., Vol. 2, pp. 52-53, Geneva, 1910.

VALLOT, HENRI. Les progrès récents de la topographie et de la géodésie de haute montagne en France. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 99-106, Geneva, 1910.

PHYSICAL GEOGRAPHY

BERGET, PROF. ALPHONSE. Commission internationale pour l'Exploration scientifique de l'Atlantique. *Bull.* Instit. Océanogr., No. 176, 14 and iv. pp., and Map, Monaco, 1910.

BOURÉE, H. Carte Générale Bathymétrique des Océans. *Bull.* de l'Instit. Océanogr., No. 175, 11 pp., Monaco, 1910.

BROUNOW, PROF. P. Über die Abhängigkeit einiger geographischen Elemente von dem barischen Relief der Erdoberfläche. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 149-160, Geneva, 1910.

BRÜCKNER, PROF. DR. ED. Das italienisch-österreichische Projekt einer gemeinsamen Erforschung des Adriatischen Meeres. Map. *Mitt.* k. k. Geog. Gesells. in Wien, Vol. 53, No. 7-8, pp. 461-475, 1910.

BURMESTER, DR. HERBERT. Einige Beobachtungen über tropische Schutzkrusten und Wadibildungen. Ills. *Globus,* Vol. 98, No. 10, pp. 149-154, 1910.

CVIJIC, PROF. J. Pleistozäne Hebungen und Vergletscherung. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 297-304, Geneva, 1910.

ECKARDT, DR. WILH. R. Der Einfluss des Waldes auf das Klima. *Sonderabdruck* Deutsch. Meteor. Jahrbuch für Aachen, Jahrgang 13, 1907, 8 pp., Karlsruhe, 1909.

FOREL, DR. F. A. L'Association Internationale de Sismologie. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 246-249, Geneva, 1910.

GERLAND, PROF. DR. G. Das seismische Verhalten des Atlantischen und des Pazifischen Ozeans. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès, Intern. de Géog., Vol. 2, pp. 220-234, Geneva, 1910.

HELLMAN, PROF. DR. G. Über die Extremen Schwankungen des Regenfalls. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 444-454, Geneva, 1910.

JACOB, CHARLES. Études récentes sur les glaciers du Dauphiné. 1903-1907. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 289-296, Geneva, 1910.

JOHNSTON-LAVIS, PROF. H.-J. Mécanisme de l'activité volcanique. Ills. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 187-200, Geneva, 1910.

MERCANTON, PROF. PAUL L. État actuel des études glaciaires. (Résumé). *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 305-306, Geneva, 1910.

POLIS, DR. Luftdruckverteilung über dem Atlantischen Ozean und die Bedeutung der drahtlosen Telegraphie für die Erweiterung der täglichen Wetterkarten. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 440-43, Geneva, 1910.

RICCO, A. Rôle de l'eau dans les phenomènes éruptifs. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 250-261, Geneva, 1910.

SAPPER, PROF. DR. KARL. Die geographische Bedeutung der Vulkane. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 262-285, Geneva, 1910.

SCHOTT, DR. GERHARD. Die Bedeutung einer Internationalen Erforschung des Atlantischen Ozeans in physikalischer und biologischer Hinsicht. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès, Intern. de Géog., Vol. 2, pp. 387-393, Geneva, 1910.

SCHOTT, DR. GERHARD. Neuere ozeanographische Arbeiten der Deutschen Marine insbesondere der Seewarte. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 420-425, Geneva, 1910.

TRABERT, PROF. WILH. Der Zusammenhang zwischen den Temperaturverhältnissen der Atmosphäre und dem Druck an der Erdoberfläche. Ill. *Sitzungsb.* der Kais. Akad. d. Wiss., Mathem.—Naturwiss. K. Klasse, Vol. 118, No. 10, Part 2, pp. 1609-1623, Vienna, 1909.

—— Bulletin Hydrographique pour l'Année Juillet 1908—Juin 1909. [North Sea, Atlantic, Baltic, English Channel]. Bureau Conseil Permanent Intern. pour l'Explor. de la Mer, xviii and 117 pp., Copenhagen, 1910.

—— Report of the Chief of the Weather Bureau, 1908-1909. Weather Bureau, U. S. Dept. of Agric. 268 pp., Washington, 1910.

—— Tabellarische Reiseberichte nach den meteorologischen Schiffstagebüchern. Deutsche Seewarte, Kais. Marine, Band 7, 1909, 245 pp., Berlin, 1910.

GENERAL

BRUNHES, PROF. JEAN. La méthode de l'échantillonnage topographique au service de la morphologie. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 164-168, Geneva, 1910.

CLAPARÈDE, ARTHUR DE. *Compte Rendu* des Travaux du Congrès. Neuv. Congrès International de Géographie, Vol. 2, xii and 576 pp., Maps, Plans and Ills., Geneva, 1910.

HOBBS, PROF. WILLIAM HERBERT. A Study of the Damage to Bridges during Earthquakes. Ills. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 214-219, Geneva, 1910.

JACCARD, DR. PAUL. Nouvelles Recherches sur la Distribution florale. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 490-494, Geneva, 1910.

KELLER, PROF. DR. C. La distribution géographique des races antiques parmi les animaux domestiques. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 502-504, Geneva, 1910.

LEINIGEN, DR. WILH. GRAF ZU. Über Erdpyramiden. Ills. *Abhandl.* d. Naturhistor. Gesells. zu Nürnberg, Vol. 18, 1 pp. 57-70, 1910.

MAMONTOV, V. N. *Altaiskĭ meteorit. 1904 goda.* Map and Ills. [The Altai Meteorite of 1904]. *Trudy* Geol. Museum of Peter the Great, Imp. Acad. of Sci., Vol. 3, No. 4, pp. 107-127, 1909.

OBERHUMMER, PROF. EUGEN. Die Terraindarstellung auf Stadtplanen. *Compte Rendu* des Travaux du Congrès, Neuv. Congrès Intern. de Géog., Vol. 2, pp. 112-115, Geneva, 1910.

TRONNIER, RICHARD. Jean Baptiste Tavernier. Leben und Reisen eines "koniglichen" Kaufmanns und Handelsgeographen des 17. Jahrhunderts. *Deutsche Geog. Blätter,* Vol. 33, No. 1-2, pp. 1-19 and No. 3, pp. 183-192, 1910.

VIGNAUD, HENRY. L'ancienne et la Nouvelle campagne pour la canonisation de Christophe-Colomb. Extrait du *Jour.* Soc. des Américs. de Paris, New Series, Vol. 6, 1909, 32 pp.

NEW MAPS

NORTH AMERICA

United States Geological Survey Maps

Topographic Survey Sheets:

Alabama: Montevallo Quadrangle, 1:62,500. Contour interval 50 ft.

Arizona: Bisbee Quad., 1:62,500, interval 50 ft.; Ray Quad., 1:62,500, interval 50 ft.

California: Bruceville Quad., 1:31,680, interval 5 ft.; Galt Quad., 1:31,680, interval 5 ft.; Castle Quad., 1:31,680, interval 5 ft.; Headreach Quad., 1:31,680, interval 5 ft.; Isleton Quad., 1:31,680, interval 5 ft.; Jersey Quad., 1:31,680, interval 5 and 10 ft.; Knights Landing Quad., 1:31,680, interval 5 ft.; Lincoln Quad., 1:31,680, interval 5 ft.; Marcuse Quad., 1:31,680, interval 5 ft.; New Hope Quad., 1:31,680, interval 5 ft.; Nicolaus Quad., 1:31,680, interval 5 ft.; Pleasant Grove Quad., 1:31,680, interval 5 ft.; Rio Vista Quad., 1:31,680, interval 5 and 10 ft.; Roseville Quad., 1:31,680, interval 5 ft.; Vernon Quad., 1:31,680, interval 5 ft.; Woodbridge Quad., 1:31,680, interval 5 ft.; Sheridan Quad., 1:31,680, interval 5 ft.

California-Nevada: Furnace Creek Quad., 1:250,000, interval 100 ft.

Colorado: Boulder Quad., 1:62,500, interval 100 ft.; Breckenridge Special Map, 1:24,000, interval 50 ft.; Danforth Hills Quad., 1:125,000, interval 100 ft.; Eaton Quad., 1:125,000, interval 20 ft.; Grand Hogback Quad., 1:125,000, interval 100 ft.; Rangely Quad., 1:125,000, interval 100 ft.; White River Quad., 1:125,000, interval 100 ft.

Illinois: Carlyle Quad., 1:62,500, interval 20 ft.; Hardinville Quad., 1:62,500, interval 20 ft.; Murphysboro Quad., 1:62,500, interval 20 ft.; Okawville Quad., 1:62,500, interval 20 ft.

Indiana: Bloomington Quad., 1:62,500, interval 20 ft.

Kansas-Missouri: Leavenworth Quad., 1:62,500, interval 20 ft.

Kentucky: Princeton Quad., 1:62,500, interval 20 ft.

Louisiana: Mound Quad., 1:31,680, interval 5 ft.

Maryland-Virginia-West Virginia: Antietam Quad., 1:62,500, interval 20 ft.

Michigan: Fowlerville Quad., 1:62,500, interval 20 ft.

Mississippi: Dundee Quad., 1:31,680, interval 5 ft.; Coahoma Quad., 1:31,680, interval 5 ft.; Jonestown Quad., 1:31,680, interval 5 ft.; Walnut Lake Quad., 1:31,680, interval 5 ft.

Missouri: Macon Quad., 1:62,500, interval 20 ft.; Higdon Quad., 1:62,500, interval 20 ft.

New Jersey-New York: Greenwood Lake Quad., 1:62,500, interval 20 ft.

Nevada: Carson Sink Quad., 1:250,000, interval 100 ft.

New York: Bath Quad., 1:62,500, interval 20 ft.; Stony Creek Quad., 1:62,500, interval 20 ft.

New York-New Jersey: Ramapo Quad., 1:62,500, interval 20 ft.

Ohio: Conesville Quad., 1:62,500, interval 20 ft.; Frazeysburg Quad., 1:62,500, interval 20 ft.; Granville Quad., 1:62,500, 20 ft.; McConnelsville Quad., 1:62,500, interval 20 ft.; Philo Quad., 1:62,500 interval 20 ft.

Oklahoma: Pawhuska Quad., 1:125,000, interval 50 ft.

Oregon: Eugene Quad., 1:62,500, interval 5 and 10 ft.

Pennsylvania: Bedford Quad., 1:62,500, interval 20 ft.; New Kensington Quad., 1:62,500, interval 20 ft.; York Quad., 1:62,500, interval 20 ft.; Zelienople Quad., 1:62,500, interval 20 ft.

Tennessee: Pikeville Special Quad., 1:62,500, interval 20 ft.

Texas: Burnet Quad., 1:125,000, interval 25 ft.; Linden Quad., 1:62,500, interval 20 ft.

Washington: Zillah Quad., 1:125,000, interval 50 ft.

Wisconsin: Waterloo Quad., 1:62,500, interval 20 ft.

Wyoming: Rock Springs Quad., 1:62,500, interval 50 ft.

West Virginia: Clay Quad., 1:62,500, interval 50 ft.; Fayetteville Quad., 1:62,500, interval 50 ft; Gassaway Quad., 1:62,500, interval 50 ft; Montgomery Quad., 1:62,500, interval 50 ft.
Utah; Fish Springs Quad., 1:250,000, interval 100 ft.
Utah-Colorado: Jensen Quad., 1:125,000, interval 100 ft.

UNITED STATES. Black maps showing distribution of granite quarries and granite, as follows: Maryland, 1 inch = 16 miles; Virginia, 1 inch = 15 miles; North Carolina, 1 inch = 16 miles; South Carolina, 1 inch = 16 miles; Georgia, 1 inch = 17 miles. Illustrate *Bull.* 426: "Granites of the Southeastern Atlantic States," by Thomas L. Watson. Washington, 1910.

UNITED STATES. Distribution of Iron Ores of the Lake Superior District in 1909. 1:2,500,000 = 39.46 miles to an inch. 4 colors. Washington, 1910. [The symbols show the amount of ore in long tons taken from each of the Lake Superior ranges and the distribution of the ore to the various centers of smelting and manufacture. A similar map was published to illustrate the movement of these iron ores in 1902 and its usefulness suggested this revised map for 1909. The descriptive text is by Mr. Birkinbine.]

UNITED STATES. United States. 1:2,500,000 = 39.46 miles to an inch. Revised edition. 3 sheets. 3 colors. U. S. Geol. Surv., Washington, 1910. [This wall map was first published in 1890, the original compilation being under the direction of Mr. Henry Gannett. Its notable features are the clear presentation of the railroad systems, the naming and boundaries of all the counties and the sharp definition of practically all the hydrographic features, including many lakes of very small area. On many European maps of this scale, considerable detail of land forms would be shown without overcrowding, but on this map there is no indication of the relief of the land. Compilers of maps for school geographies, who seem to have difficulty in placing towns on the right side of rivers, may derive advantage from consulting this map. An inset shows Alaska, (1 inch = 170 miles) and gives a good idea of its hydrography and the position of towns, including a few new names.]

UNITED STATES. United States. Relief Map. 1 inch = 110 miles. Compiled by Henry Gannett. 8 tints for elevations and one for depths. U. S. Geol. Surv., Washington, 1910. [This excellent map showing the relief forms of the country, was first produced by Mr. Gannett, about 20 years ago and has been very useful, especially in schools and in the compilation of other maps showing the relief forms of the United States.]

U. S. COAST AND GEODETIC SURVEY CHARTS.

New or corrected editions of charts: *Connecticut.* North Shore of Long Island Sound, Fairfield to George's Rock. 1:10,000. *Georgia.* No. 155. From Hunting Island to Ossabaw Island including Port Royal Sound and Savannah River. 1:80,000. *Massachusetts.* No. 110. Cape Cod Bay. 1:80,000. *Maine.* No. 103. Mt. Desert Island. Frenchman's and Blue Hill Bays and Approaches. 1:80,000. *New York.* No. 271. North Shore of Long Island Sound. Rhineck to New Rochelle. 1:10,000. *New Jersey.* No. 565. Passaic River. Newark Bay to Belleville. 1:10,000. *North Carolina.* No. 146. Oracoke Inlet to Beaufort including Core Sound. 1:80,000. *Oregon and Washington.* No. 6,100. Pacific Coast. Cape Lookout to Gray's Harbor. 1:200,000. *Washington.* No. 6,400. Sea Coast and Interior Waters of Washington from Gray's Harbor to Semiammoo Bay. 1:300,000; Gray's Harbor No. 6,195, 1:40,000. *Rhode Island.* No. 352. Providence Harbor. 1:10,000. *Hawaiian Islands.* No. 4,005 Kahului Harbor and Approaches. Island of Maui. 1:10,000. *Philippine Islands.* No. 4,344. Mindoro, North Coast, Port Gallera and Varadero Bay. 1:10,000. *Philippine Islands.* No. 4,200. Mercator Projection. Compiled from United States and Foreign sources. Washington, D. C., October, 1910. [This fine chart shows many hundreds of soundings in fathoms, with numerous indications of the nature of the sea bottom, the direction of currents, the position of lighthouses, etc.]

U. S. HYDROGRAPHIC OFFICE CHARTS

Pilot Chart of the North Atlantic Ocean, Dec. 1910.

U. S. DEPT. OF AGRICULTURE MAPS

UNITED STATES. Soil Survey Maps of Franklin Co., Ga.; Sumner Co., Tenn.; Spencer Area, W. Va.; Marianna Area, Fla.; Anne Arundel Co., Md.; Atchison Co., Mo.; Anderson Co., S C.; Morris Co., Tex. 1:63,360 and 1:62,500. [In colors with contours of elevation and descriptive text.]

CALIFORNIA. Administrative map of Yosemite National Park. 1:125,000 = 1.9 miles to an inch. Topography by R. B. Marshall and A. H. Sylvester. 28 colored and black symbols. Edition of April, 1910. U. S. Geol. Surv., Washington, 1910. [The present edition of this fine map brings all information to date. It should be used as a basis in the production of atlas and tourist maps of this region.]

MARYLAND. A plan of the boundary lines between the Province of Maryland and the three lower counties of Delaware with part of the parallel of latitude, which is the boundary between the Provinces of Maryland and Pennsylvania. 1 inch = 6 miles. Black. In pocket. Illustrates "Report on the Resurvey of the Maryland-Pennsylvania Boundary, part of the Mason and Dixon line." Maryland Geol. Surv., Vol. 7, Baltimore, 1908. [A facsimile of the parchment map prepared by Mason and Dixon in 1768.]

MARYLAND. Map showing the limestones of Maryland. 1 inch = 3 miles. 12 tints for geological formations. Illustrates "Report on the Limestones of Maryland" by E. B. Mathews and John Grasty. Maryland Geol. Surv., Vol. 8, Baltimore, 1909.

MARYLAND. Map of Maryland showing Floristic Zones and Ecological districts. No scale. Black. Illustrates "The Plant Life of Maryland," by F. Shreve and others. Maryland Weather Serv., Vol. 2, Baltimore, 1910.

MARYLAND. Maps of Maryland. (a) Showing the relative valuation of farm buildings; (b) the relative production of corn; (c) the relative production of wheat; (d) the relative production of tobacco; (e) the acreage in canning crops; (f) the relative production of hay; (g) the relative production of milk. Black. Small maps illustrating "The Relation of Natural Vegetation to Crop Possibilities" by F. Shreve. Maryland Weather Serv., Vol. 3, Baltimore, 1910.

SOUTH DAKOTA. Map of the Black Hills region. 1 inch = 22 miles. Arranged by C. C. O'Harra. Black. Illustrates the "Badland Formations of the Black Hills region" by the same author. South Dakota School of Mines, Dept. of Geol., *Bull.* No. 9, Rapid City, S. D., 1910. [Four symbols show geological formations. Based chiefly on Darton's survey (1905) as modified by Matthew and Thomson (1906-07).]

UNITED STATES. Die Wasserstrassen im östlichen Teile der Vereinigten Staaten von Amerika. 1:7,500,000 = 118.37 miles to an inch. Four colors. With paper "Binnenschiffahrtswege in den Vereinigten Staaten von Amerika". By Hans Fehlinger. *Deut. Rund. f. Geog.*, Vol. 33, No. 1. Vienna, 1910. [Shows in colors the navigable rivers, canals and canalized rivers of the U. S. as far west as Central Texas and Eastern North Dakota.]

CANADA. Map of Bow River Valley between Bow Peak and Castle Mountain Station. 1 inch = 2½ miles. Contour interval 1,000 feet. Black. Illustrates "Pre-Cambrian Rocks of the Bow River Valley, Alberta, Canada". By Charles D. Walcott. *Smiths. Misc. Coll.*, Vol. 53, No. 7, Washington, 1910.

CANADA. Ontario. (Gowganda sheet). 1:250,000 = 3.95 miles to an inch. Standard Topographical map, sheet 8, N. E. (part). 4 colors. R. E. Young, Chief Geographer. Dept. Interior, Ottawa, 1910.

CANADA. Map of Western Canada. 4 sheets. 1:2,217,000 = 35 miles to an inch. 6 colors. R. E. Young, Chief Geographer, Dept. Interior, Ottawa, 1910. [A superior map, sharply differentiating between the surveyed and unsurveyed parts of rivers, giving names of all new townships in the western provinces

now being settled, railroad lines in operation or construction and a clear idea of drainage basins. No attempt is made to show surface forms.]

CANADA. Prince Edward Island, Nova Scotia and New Brunswick. Standard Topographical Map. 1:250,000 = 3.95 miles to an inch. 6 colors. R. E. Young, Chief Geographer. Dept. Interior, Ottawa, 1910.

SOUTH AMERICA

CHILE. Trabajos jeodésicos Chilenos. 1:7,000,000 = 110 miles to an inch. 2 colors. With "Reseña Jeneral sobre el Estado actual de la Cartografia Americana." By Luis Riso Patron. Santiago de Chile, 1909. [Shows the trigonometrical network as extended in Chile at the time of publication. The paper with the map, is an excellent summary of the progress and position of cartography in the countries of America, in 1908.]

PERU. Mapa que comprende las ultimas Exploraciones y Estudios verificados. Desde 1900, Hasta 1906. 1:1,000,000 = 15.78 miles to an inch. 4 colors. *Bol.* de la Soc. Geog. de Lima, año xix, Tomo xxv. Trimestre Primero. Lima, 1909.

SOUTH AMERICA. Eduard Graf v. Wickenburgs Reisen in Südamerika 1907-10. 1:25,000,000 = 394.5 miles to an inch. 3 colors. *Pet. Mitt.*. 56 Jahrg., 11 Halbband, 5 Heft, 1910. [Illustrates Count von Wickenburg's summary of his route through southern and western South America, from Cape Horn to the Amazon.]

AFRICA

ALGERIAN SAHARA. Croquis Schematique des régions de l'Ouest du cercle de Colomb. Dressé par le Service des Renseignements et mis à jour par le lieutenant Bernard. 1:800,000 = 12.6 miles to an inch. Black. Illustrates "Les routes vers la Moulouya". *Bull. Trim.* de la Soc. de Géog. et d'Arch. d'Oran. 33e année, Tome xxx, Fasc. cxxii (1er Trim.). Oran, 1910.

BRITISH WEST AFRICA. Sketch map of Gold Coast and Ashanti. 1 inch = 65 miles. Black. Illustrates "The Topography climate and vegetation of the Gold Coast". *Scott. Geog. Mag.*, Vol. xxvi. No. 9, 1910. [Shows the distribution of the various types of forests within the limits of the Gold Coast and Ashanti.]

CENTRAL SUDAN. La Frontière Quadai-Darfour. 1 inch = 8.7 miles. Black. With paper, same title, in *l'Afrique Française*, dix-neuvième Année, p. 253, 1910. [Based on the map of the Anglo-Egyptian Sudan, Intell. Off., Khartum, Ed. of 1909.]

CONGO, Belgian. Les voies d'accés le Katanga. 1 inch = 270 miles. Black. With "Les Chemins de Fer nationaux vers le Katanga". *Le Mouve. Géog.* No. 43, Brussels, 1910. [Gives the latest information as to the railroads in operation, construction, or projected to or towards the great mining region of Katanga, in the S. E. part of the Belgian Congo.]

EAST TROPICAL AFRICA. Karte der Eisenbahnen in Ost- Afrika. No scale. 3 colors. With paper "Die Eisenbahnen Ostafrikas." By E. Amonn. *Deut. Rund. f. Geog.* Vol. 33, No. 2, Vienna, 1910. [Shows in colors the railroads in operation, building or projected in British East Africa, German East Africa and Uganda.]

EGYPT. Egypt. 1:50,000 = 0.7 mile to an inch. Sheets V–IV, V–V, V–VI, V–VII, VI–VI N. W. Survey Dept., Egypt, Cairo, 1910. 50 mills, a sheet.

NORTH AFRICA-WEST ASIA. Der Orient. 1:20,000,000 = 315.6 miles to an inch. 3 colors. By Ewald Banse. With paper, "Abflusslosigkeit und Entwässerung im Orient," same author. *Globus*, xcviii, p. 117, 1910. [A good map showing the waterless areas and areas of interior drainage in the Sahara, Sudan, Arabia, Iran and Asia Minor.]

NORTHERN NIGERIA. Part of Nassarawa Province. 1:500,000 = 7.89 miles to an inch By D. Cator. Black. *Geogr. Journ.*, London, Dec., 1910. [A short description of the map, by Mr. Cator, is given.]

SAHARA. Itinéraire du Capitaine Cortier dans l'Adrar. 1:1,500,000 = 23.67 miles to an inch. Black. Illustrates "Itinéraire du Capitaine Cortier, de Teleya à Tombouctou". *La Géog.*, Vol. xxi, No. 6, Année, Paris, 1910.

SOUTH AFRICA. South Africa showing railways. 1:10,000,000 = 157.8 miles to an inch. 2 Colors. Illustrates "Railway Projects in South Africa". *Geogr. Journ.*, London Dec., 1910. [Shows a number of projected lines in West Africa which if completed, as proposed, to railroad lines in the East, will make several Transcontinental railroads between the Indian Ocean and the Atlantic.]

SOUTHERN NIGERIA. The Oban District. From a survey by P. A. Talbot, 1909. 1:200,000 = 3.15 miles to an inch. Four colors. Inset diagram of main triangulation on which the map is based. Illustrates the "Land of the Ekoi, Southern Nigeria" by same author. *Geogr. Journ.*, London, Dec., 1910. [On the margin are lists of positions. The area mapped, is in the southeastern part of the province between Cross River and Cameroons.].

ASIA

JAPAN. Geologic sketch of the Holgol district. 1:50,000 = 0.79 mile to an inch. 5 colors. *Journ.* of the Coll. of Sci., Imperial Univ. of Tokio, 1910.

PALESTINE. Plan of Jaffa. 1 inch = 560 feet. Black. With paper, "Jaffa," Dr. L. Saad. *Globus,* Vol. xcviii, p. 138, 1910.

SIBERIA. Fundorte von Mammut und Nashorn—Resten in Siberien. 1:20,000,000 = 315.6 miles to an inch. 4 colors. *Pet. Mitt.,* 11 Halbband, 5 Heft, Taf. 44. [Based on map of the Imperial Russian Academy of Sciences, 1909. Shows all the locations where mammoths and rhinoceroses have been found in Siberia, with the dates of the finds from the middle of the 17th century to the present time.]

EUROPE.

THE ALPS. Hölzel's Wandkarte der Alpen auf Grundlage der V. von Haardtschen Karte. Vollständig neu bearbeitet von Dr. Franz Heiderich. 1:600,000 = 9.4 miles to an inch. 13 colors and tints. Verlag von Ed. Hölzel in Wien, 1909. In sheets, M. 31. [This map takes its place in the fore front of the best detailed world maps of the whole Alpine regions. Its topography is based upon Government surveys. The contours of elevation (from 200 to 3,000 meters), reinforced by light and shade, give clear expression to relief features. All details are sharply defined and the map is easy to read. For library and school purposes this product will be very useful in all countries. At the bottom are several profiles through various parts of the Alps].

AUSTRIA-HUNGARY. G. Freytag's Automobil- und Radfahrer-Karten. (a) Blatt 20, Brünn; (b) Blatt 29. Südtirol und Oberitalien. 1:300,000 = 4.73 miles to an inch. In colors. [Examples of a good series of automobile route maps.]

BULGARIA. Situationsplan der Eisenbahnstrecke Radomir-Küstendil in Bulgarien. 1:200,000 = 3.15 miles to an inch. 3 colors. With paper, "Durch das Strumadefilee nach der bulgarischen Thermenstadt Küstendil," by F. Meinhard. *Deutsche Runds. f. Geogr. u. Stat.,* xxxii Jahrg., p. 528, Vienna, 1910.

CENTRAL EUROPE. G. Freytags Automobil-Routenkarte von Mittel-Europa. 1:2,000,000 = 31.56 miles to an inch. Inset Umgebung von Wien, 3 colors. G. Freytag & Berndt, Wien, 1910. M. 2.50. [A good road map with red figures showing distances between places in kilometers.]

FRANCE. Étude du Profile en Long des Cours d'Eau français. État d'avancement en 1910. 1:2,200,000 = 34.7 miles to an inch. 3 colors. With paper, same title, by Emm. de Margerie. *Ann. de Géog.* No. 106, xix^{e} Année., 1910. [Shows the present state of the mapping of profiles of the French rivers.]

GERMANY. Thüringerwald-Karten. Blatt 1: Eisenach-West; 5: Friedrichroda-Waltershausen; 14: Ilmenau. 1:50,000 = 0.79 mile to an inch. Colors. Descriptive text. 80 pfg. each. H. Kahle, Eisenach, 1910. [Examples of this excellent series (34 maps) of small districts].

NORWAY (a) Topografisk kart over kongeriget Norge. 1:100,000 = 1.5 mile to an inch. Sheets: L 13, Saltdalen; 19 D, Gran; V 7, Baeivasgiedde. (b) Generalkart over det sydlige Norge i 18 Blade. xviii. 1:400,000 = 6.33 miles to an inch. Udgivet of Norges geografiske Onmaaling Kristiania, 1910.

SWEDEN. Seismiche Karte von Schweden, entworfen im Jahre 1910. Von Proof. Dr. R. Kjellén. 1 inch = 50 miles. 5 tints and black. *Geogr. Zeitsch.* Vol. 16, No. 11, Leipzig, 1910.

UNITED KINGDOM. (a) Map showing Positions of Climatological Stations. 1 inch = 80 miles. Black. [Distribution of observing stations and their height above sea level;] (b) Map showing the positions of stations having self-recording instruments. 1 inch = 80 miles. Black; (c) map showing positions of meteorological stations whose reports are used in the preparation of the London daily weather reports. No scale. [These stations extend from Moscow to Iceland and Horta. Stations which report to London by telegraph are distinguished from others.] Illustrates Fifth *Annual Report* of the Meteorological Committee, for the year ended March 31, 1910, London, 1910.]

POLAR

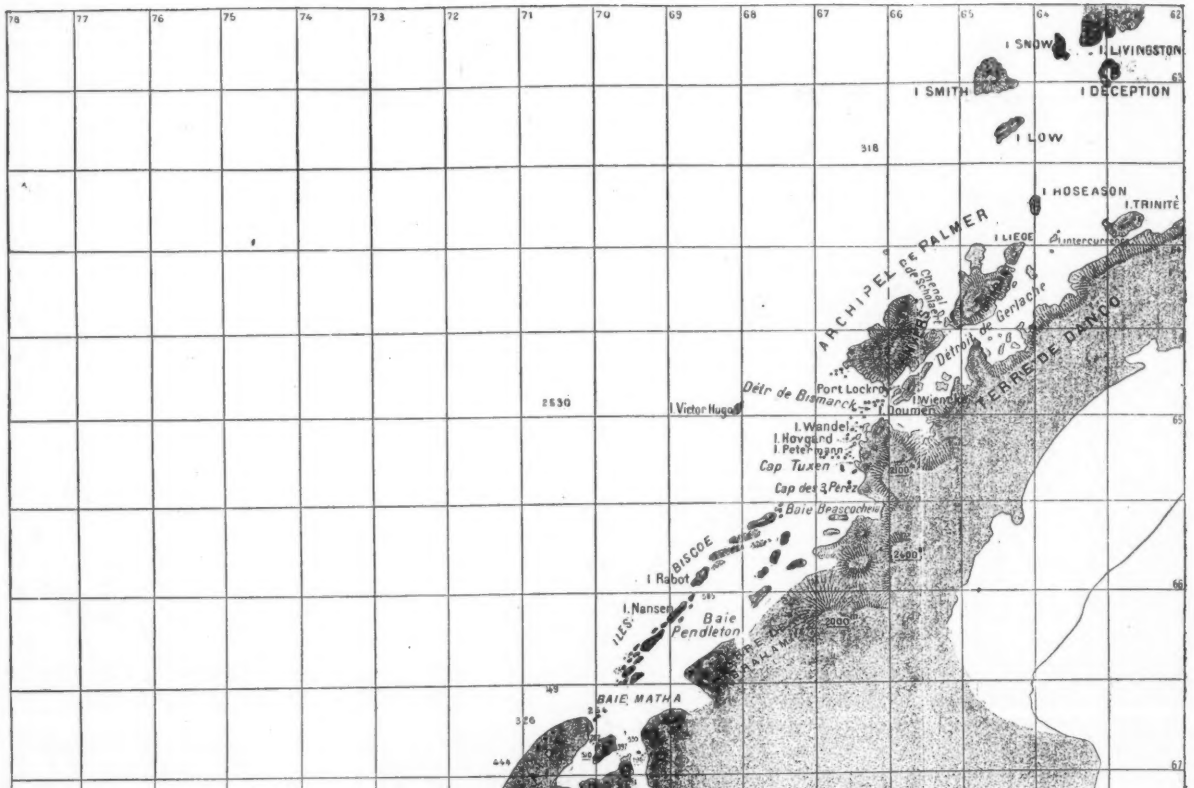
DANISH WEST GREENLAND. (a) Nördliches Westgrönland; (b) Südliches Westgrönland. 1:5,000,000 = 78.9 miles to an inch. Black. By M. C. Engell. With paper, "Bemerkungen über die geographische Lage der Niederlassungen in Westgrönland, same author. *Mitt.* der k. k. Geogr. Ges. in Wien, Band 53, Taf. ix und x, Vienna, 1910.

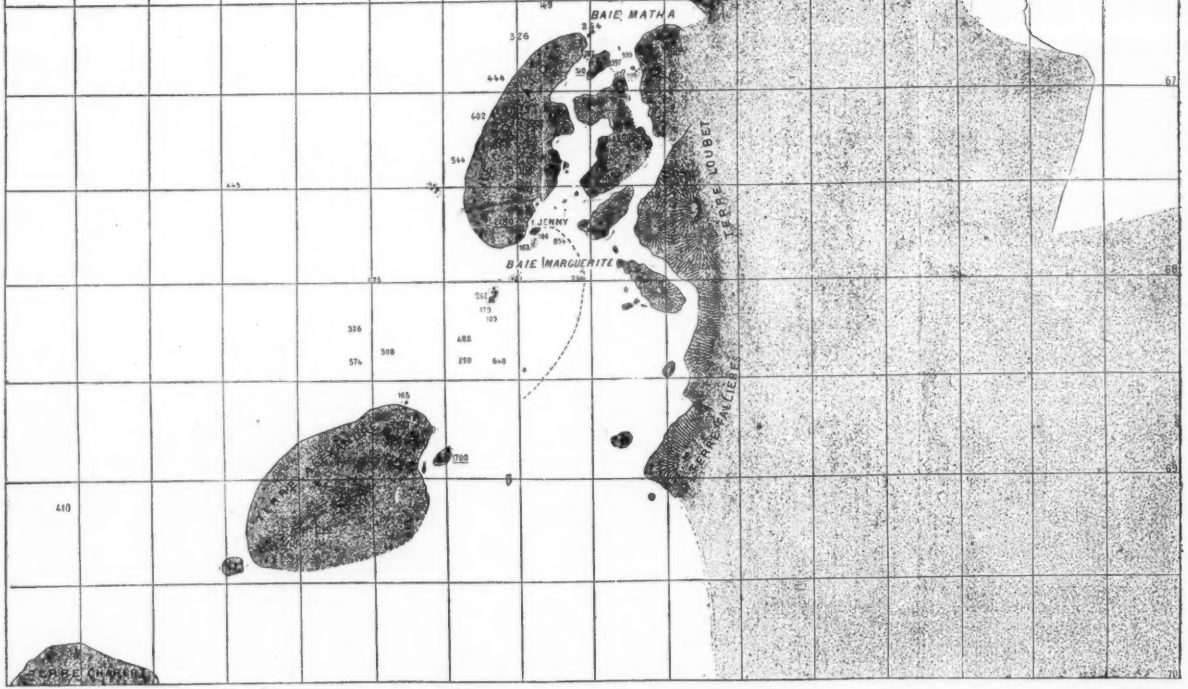
WORLD. Weltkarte der Erzlagerstätten. 1:45,000,000 = 710.22 miles to an inch. Entworfen von Diplomingenieur J. W. H. Adam. 11 colors for minerals. Insets of Middle Europe, 1:7,500,000, Central Germany, 1:2,500,000, and Southern Norway and S. Sweden, G. Freytag & Berndt, Wien, no date. Linen, M. 2.50. [Shows distribution of ore deposits. The data given are so deficient for many parts of the world, as Alaska, Katanga, German Southwest Africa, The Philippines and some other lands, as to give the impression that the map is not of recent compilation].

SCHOOL WALL MAPS AND ATLASES

SCHOOL WALL MAPS. (a) NORTH AMERICA. Physical features. 1:7,500,000 = 118.37 miles to an inch. 16 colored symbols for heights and depths. Clarendon Press, Oxford and New York, 1910. [An example of "the Oxford Wall Maps" edited by A. J. Herbertson, M.A., professor of Geography, Univ. of Oxford. The series embraces sets of maps showing (1) physical features without names, (2) physical features with physical names, (3) physical features with political names, (4) rainfall, (5) vegetation. These maps, 33 in all, are each 60 x 40 inches in size, and 20 of them are now on the market. This map of North America shows physical features, with names, the most important of which are printed in large type which all the class may read. The chief mountains and rivers stand out clearly, many heights and contours of elevation are shown, and the contours of ocean depths and the limits of the coastal plain are brought out with much clearness;] (b) AFRICA. Vegetation. 1:7,500,000 = 118.37 miles to an inch Compiled by Dr. M. Hardy. 16 colored symbols and white. Clarendon Press, Oxford and New York, 1909. [Another of the Oxford Wall Maps. It is on the Sanson-Flamsteed projection, equal area, a square inch on the map representing 14,000 sq. miles in nature. It illustrates, in bold colors, the distribution of the leading types of vegetation, the Desert is differentiated from the wide zone of semi-desert, bordering the Sahara on the north, in which, the fibre alfa is an export product. Forests are strongly contrasted with the savannas. The distribution of the tropical and temperate forests, the zone where the olive thrives, all the oases, the steppes adapted for stock raising, etc., are clearly defined. The map is adapted for large class-rooms.]

ATLAS. Prof. A. L. Hickman's Geographisch-statistischer Taschen-Atlas von Österreich-Ungarn. 3. vollständig neu bearbeitete Auflage. 60 Diagrammen. Karten und Bilder. G. Freytag & Berndt, Wien, 1909. Kr. 5. [The latest issue of this well-known atlas of Austria-Hungary fitted for the pocket and containing many good maps and 91-pp. of statistical and descriptive text.]


I SNOW
I. LIVINGSTON
I SMITH
I DECEPTION
I LOW
I HOSEASON
I. TRINITÉ
I LIEGE
ARCHIPEL DE PALMER
Détr de Bismarck
Port Lockroy
I. Wiencke
I. Doumer
TERRE DE DANCO
I. Wandel
I. Hovgard
I. Peterm
Cap Tuxen
Cap des Pères
Baie Beascochea
I. Victor Hugo
I. Rabot
I. Nansen
Baie Pendleton
BAIE MATHA
2530
2100
2000
318
326
444



CARTE PROVISOIRE DE L'ANTARCTIQUE SUD-AMÉRICAINE

D'APRÈS LE LEVÉ FAIT PAR M. GONGRAIN

FIG. 1.